

**456-TP-003-001**

# **ECS Project Training Material Volume 3: Production Planning and Processing**

**Technical Paper**

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**RESPONSIBLE ENGINEER**

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# Abstract

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This is Volume 3 of a series of 10 volumes containing training material for the Pre-Release B Testbed of the Earth Observing System Data and Information System (EOSDIS) Core System (ECS). This lesson provides a detailed description of the process required for creating, modifying, and implementing production requests and production plans and monitoring the processing of data processing requests.

**Keywords:** training, instructional design, course objective, production request, production plan, data processing request, production, planning, processing.

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# Introduction

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## Identification

Training Material Volume 3 is part of a series of Technical Papers that will be used to teach Maintenance and Operations (M&O) concepts to the M&O staff at the following Distributed Active Archive Centers (DAACs): Langley Research Center (LaRC), National Snow and Ice Data Center (NSIDC) and EROS Data Center (EDC).

## Scope

Training Material Volume 3 describes the procedures by which the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

This document reflects the August 23, 1995 Technical Baseline maintained by the contractor Configuration Control Board (CCB) in accordance with ECS technical direction #11, dated December 6, 1994.

## Purpose

The purpose of this Technical Paper is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

## Organization

This document is organized as follows:

Introduction:	The Introduction presents the document identification, scope, purpose, and organization.
Student Guide:	The Student Guide identifies the core elements of this lesson. All Lesson Objectives and associated topics are included.
Slide Presentation:	Slide Presentation is reserved for all slides used by the instructor during the presentation of this lesson.

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# Production Planning and Processing Overview

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## Lesson Overview

This lesson will provide you with the complete process by which the production team prepares production plans and monitors production processing. The processes described in the lesson apply primarily to production planners and production monitors. The procedures involved in production planning and processing include such tasks as preparing production requests, preparing production plans and monitoring data processing.

## Lesson Objectives

**Overall Objective** - The overall objective of the Production Planning and Processing lesson is for Science and Communications Maintenance and Operations (M&O) personnel to develop proficiency in the procedures that apply to production planning and production processing operations for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS).

**Condition** - The student will be given oral or written information and requirements for performing production planning and processing activities, access to the planning and production processing systems and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform production planning and processing activities in accordance with the prescribed procedures without error.

**Specific Objective 1** - The student will perform the steps involved in creating a new production request.

**Condition** - The student will be given a statement of the requirements for preparing a new production request, access to the planning system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in preparing a new production request in accordance with the applicable procedure.

**Specific Objective 2** - The student will perform the steps involved in modifying a production request.

**Condition** - The student will be given a statement of the requirements for modifying a production request, access to the planning system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in modifying a production request in accordance with the applicable procedure.

**Specific Objective 3** - The student will perform the steps involved in creating a new production plan.

**Condition** - The student will be given a statement of the requirements for preparing a new production plan, access to the planning system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in preparing a new production plan in accordance with the applicable procedure.

**Specific Objective 4** - The student will perform the steps involved in reviewing data processing requests.

**Condition** - The student will be given a statement of the requirements for reviewing data processing requests, access to the planning system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in reviewing data processing requests in accordance with the applicable procedure.

**Specific Objective 5** - The student will perform the steps involved in reviewing a production plan timeline.

**Condition** - The student will be given a statement of the requirements for reviewing a production plan timeline, access to the planning system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in reviewing a production plan timeline in accordance with the applicable procedure.

**Specific Objective 6** - The student will perform the steps involved in configuring AutoSys runtime options.

**Condition** - The student will be given a statement of the requirements for configuring AutoSys runtime options, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in configuring AutoSys runtime options in accordance with the applicable procedure.

**Specific Objective 7** - The student will perform the steps involved in configuring AutoSys hardware groups.

**Condition** - The student will be given a statement of the requirements for configuring AutoSys hardware groups, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in configuring AutoSys hardware groups in accordance with the applicable procedure.

**Specific Objective 8** - The student will perform the steps involved in reviewing hardware status (including changing hardware status views) using AutoSys.

**Condition** - The student will be given a statement of the requirements for reviewing hardware status (including changing hardware status views) using AutoSys, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in reviewing hardware status (including changing hardware status views) using AutoSys in accordance with the applicable procedure.

**Specific Objective 9** - The student will perform the steps involved in reviewing data processing request (DPR) dependencies.

**Condition** - The student will be given a statement of the requirements for reviewing DPR dependencies, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in reviewing DPR dependencies in accordance with the applicable procedure.

**Specific Objective 10** - The student will perform the steps involved in reviewing the DPR production timeline.

**Condition** - The student will be given a statement of the requirements for reviewing the DPR production timeline, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in reviewing the DPR production timeline in accordance with the applicable procedure.

**Specific Objective 11** - The student will perform the steps involved in reviewing and configuring AutoSys alarms.

**Condition** - The student will be given a statement of the requirements for reviewing and configuring AutoSys alarms, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in reviewing and configuring AutoSys alarms in accordance with the applicable procedure.

**Specific Objective 12** - The student will perform the steps involved in reviewing job activities and job selection criteria using AutoSys.

**Condition** - The student will be given a statement of the requirements for reviewing job activities and job selection criteria using AutoSys, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in reviewing job activities and job selection criteria using AutoSys in accordance with the applicable procedure.

**Specific Objective 13** - The student will perform the steps involved in modifying job priority using AutoSys.

**Condition** - The student will be given a statement of the requirements for modifying job priority using AutoSys, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in modifying job priority using AutoSys in accordance with the applicable procedure.

**Specific Objective 14** - The student will perform the steps involved in modifying job status using AutoSys.

**Condition** - The student will be given a statement of the requirements for modifying job status using AutoSys, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in modifying job status using AutoSys in accordance with the applicable procedure.

**Specific Objective 15** - The student will perform the steps involved in reviewing activity logs and job dependency logs.

**Condition** - The student will be given a statement of the requirements for reviewing activity logs and job dependency logs, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in reviewing activity logs and job dependency logs in accordance with the applicable procedure.

**Specific Objective 16** - The student will perform the steps involved in generating standard production reports.

**Condition** - The student will be given a statement of the requirements for generating standard production reports, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in generating standard production reports in accordance with the applicable procedure.

**Specific Objective 17** - The student will perform the steps involved in generating AutoSys reports.

**Condition** - The student will be given a statement of the requirements for generating AutoSys reports, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.



**Standard** - The student will perform without error the steps involved in generating AutoSys reports in accordance with the applicable procedure.

**Specific Objective 18** - The student will perform the steps involved in defining and running monitors/browsers.

**Condition** - The student will be given a statement of the requirements for defining and running monitors/browsers, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in defining and running monitors/browsers in accordance with the applicable procedure.

**Specific Objective 19** - The student will perform the steps involved in changing the database maintenance time.

**Condition** - The student will be given a statement of the requirements for changing the database maintenance time, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in changing the database maintenance time in accordance with the applicable procedure.

**Specific Objective 20** - The student will perform the steps involved in performing science product quality assurance (QA).

**Condition** - The student will be given a statement of the requirements for performing science product QA, access to the data processing system (through a workstation or terminal) and a copy of 456-TP-003-001, *ECS Training Material Volume 3: Production Planning and Processing*.

**Standard** - The student will perform without error the steps involved in performing science product QA in accordance with the applicable procedure.

## **Importance**

This lesson applies to students who will be members of the ECS production team (especially production planners and production monitors). The lesson will provide them with the knowledge and skills needed when performing their assigned tasks.

Those tasks include (among other things) preparing production requests, preparing production plans and monitoring DPR production. The lesson describes why and how the activities are performed. Consequently, the students will become aware of what tasks they will be performing on the job and how to accomplish those tasks.

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# Creating/Updating a Production Request

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## Science Software and Production Requests

Production planning occurs at the Data Active Archive Centers (DAACs). It is the process by which the Production Planner notifies the Planning Subsystem (PLS) of the science processing jobs that are to be processed and when they are to be processed.

Science Software (SS) is one of the keys to production planning and processing:

- does the actual data processing.
- is developed by satellite Instrument Teams (ITs).
- is embodied in Product Generation Executives (PGEs) when the software is integrated into the ECS production processing environment.
  - PGEs are science software code (e.g., executable programs or shell scripts) that contain the instructions for processing data to create the desired products.

The Production Request (PR) is another key to production planning and processing. The Production Planner defines ECS science data processing jobs in terms of PRs.

- A PR is an order for data to be produced by the data processing system.
- A single PR may specify several jobs that are to be run over a period of time or a single job producing a single set of data.
- PRs may apply to the processing of new data (standard PRs or standing orders) or the reprocessing of existing data (reprocessing PRs).
- Each PR identifies a specific PGE for generating a particular type of product.
  - Some PGEs are dependent on others; i.e., some PGEs require input data that are the output of other PGEs.
  - Prior to Release B there was to be no automatic "data chaining" to determine whether there was a particular sequence for scheduling the processing of PGEs that were prerequisite to generating a higher-level product.
  - The planning software will recognize and reject a PR when the PR specifies a PGE that requires data from another PGE that has not yet been specified in a PR.

## Planning Subsystem

The Planning Subsystem in the ECS Science Data Processing Segment (SDPS) is the subsystem that the Production Planner uses when developing a production plan. The Production Planner

has access to the Planning Subsystem through the Production Request Editor and the Planning Workbench. The Production Request Editor (PRE) is used for creating or modifying PRs; the Planning Workbench is used for scheduling PRs.

The Planning Subsystem performs the following functions:

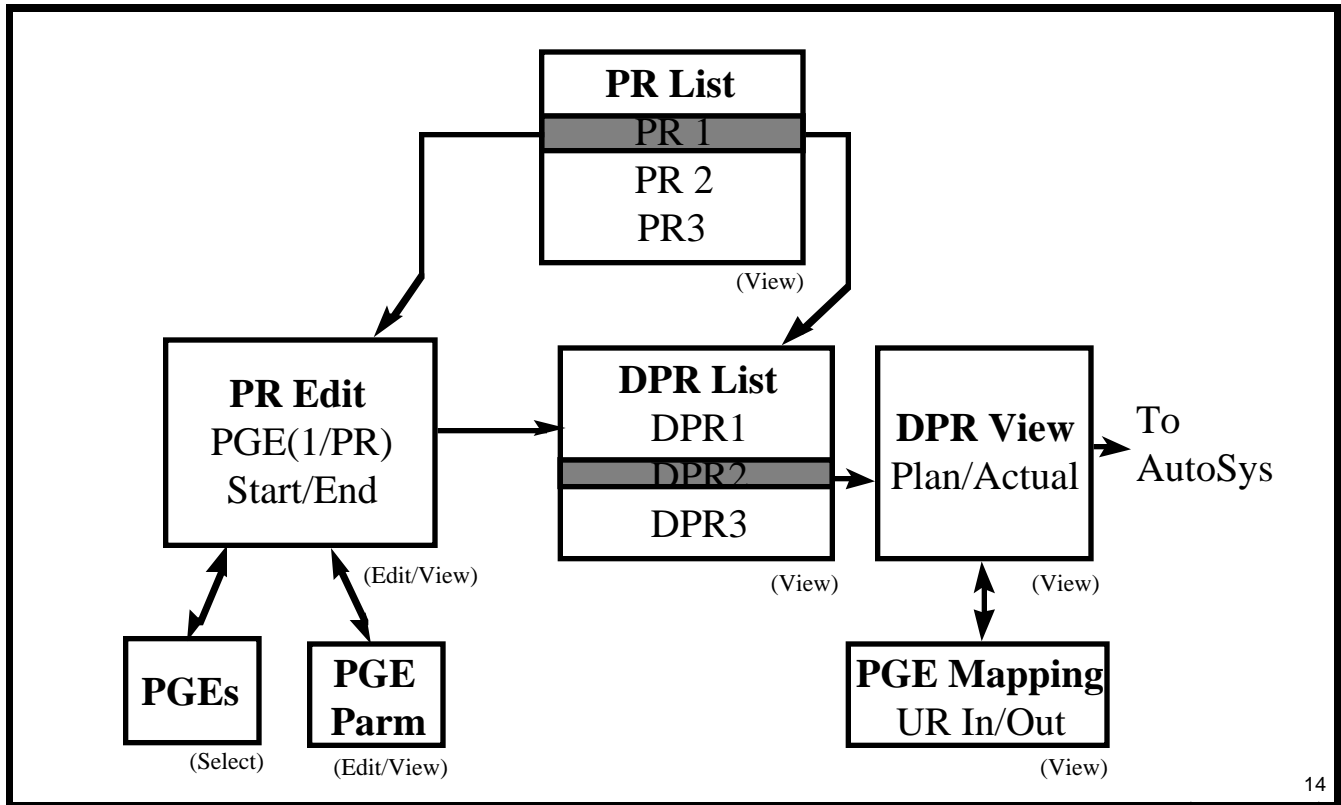
- uses each PR to generate either one or a series of Data Processing Requests (DPRs).
  - Each DPR corresponds to one execution of a single PGE.
  - Each DPR contains the information that is needed by the SDPS processing function, including PGE-related information.
- checks the availability of the data required for the DPR, either from the data server (if the data have been previously ingested) or from internal predictions (if the data are expected to arrive in the future).
- determines what data will be included in the DPR output so the system can make predictions concerning the availability of data for subsequent PGEs.

Figure 1 shows the relationships among the PRs, PGEs, and DPRs as they are accessed through the Production Request Editor graphical user interface (GUI).

## Production Planning Considerations

During normal operations it is expected that the Production Planner will not have to add PRs to the PDPS database very frequently. The frequency of this activity is, to some extent, determined by the IT responsible for the science software.

- The PR is a template request to generate a particular data product and results in a production run of the associated IT-provided PGE.
  - PR specifies a time range over which the data products are to be produced or the PGEs are to be scheduled.
    - PR might request that the data product be produced for only a single day's data.
    - PR might request that data products be produced for every opportunity of input data for several months, resulting in several hundred jobs being planned and run as the input data become available.
  - Early in a mission the IT may prefer to request processing for a short time period only (e.g., a week or less).
    - At that time the IT is gaining an understanding of the on-orbit behavior of the instrument, the resulting data, and the interaction of the science processing software with real data.



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**Figure 1. Production Request Editor Flow**

- IT reviews the quality of the products and notifies the Production Planner of the need for any changes to the PR (e.g., discontinue the PR, change time ranges, or modify input parameters).
- When the IT has developed a good understanding of the instrument’s behavior, the team may be comfortable requesting processing for months at a time.
- DAAC operations may have operational reasons for wanting to issue processing requests for a more limited time period.
- The Production Planner has to balance the various considerations when determining whether or not to create or update a PR.

Planning decisions are made on the basis of locally defined planning strategies. The production planning tools are intended to be flexible enough in their design to support the particular planning and scheduling cycles of the operations organization at each DAAC.

Before planning production the Production Planner must coordinate with the Resource Planner to resolve all resource allocation issues. The Resource Planner provides the Production Planner

with a list of resources available for use in processing and an allocation profile with time for those resources.

The Production Planner prepares a monthly and weekly production plan. In addition, the Production Planner develops a daily production schedule from the most current weekly plan. Although production planning varies from DAAC to DAAC, the following guidelines are generally applicable:

- Monthly plans
  - developed for the coming month and one or two months in advance.
  - produced, reviewed, updated, published and distributed approximately two weeks before the beginning of the month.
  - plan for the coming month is used to establish a baseline against which production targets can be measured.
- Weekly plans
  - produced, reviewed, updated, published and distributed approximately five days before the beginning of the coming week.
  - used to produce a baseline for comparison of planned vs. actual production results.
- Daily plan or schedule
  - produced each day for the next processing day.
  - developed from the current weekly plan, adjusted to reflect the actual processing accomplished and the actual resources available at the time the daily schedule is generated.

During normal processing, when reasonably accurate predictions of the processing time for the PGEs are available, the processing schedule should result in a reasonably accurate prediction of when data products will be generated. However, during abnormal situations (e.g., equipment failure), what is actually accomplished could depart significantly from the plan. In such situations, the Production Planner may choose to develop new plans to reflect current events. This process is known as “replanning.”

## **Creating a New Production Request**

The new Production Request process begins when the Production Planner starts the Production Request Editor graphical user interface (GUI) from a UNIX prompt. The Production Planner enters the Request Definition, PGE parameters, duration, and comments for the new Production Request.

Before creating the new PR the Production Planner must have available the following information:

- Name of the PR.
- Priority of the PR.
- PGE to be used in processing the PR.
- PGE parameters to be used.
- Parameter(s) to be changed (optional)
- Start Date.
- Start Time.
- End Date.
- End Time.
- Comments (if applicable).

The Production Planner assigns an initial processing priority based on the local DAAC policy. Job Priority specifies the priority of the job, with 1 (one) being the highest priority and 99 the lowest.

### Creating a New Production Request

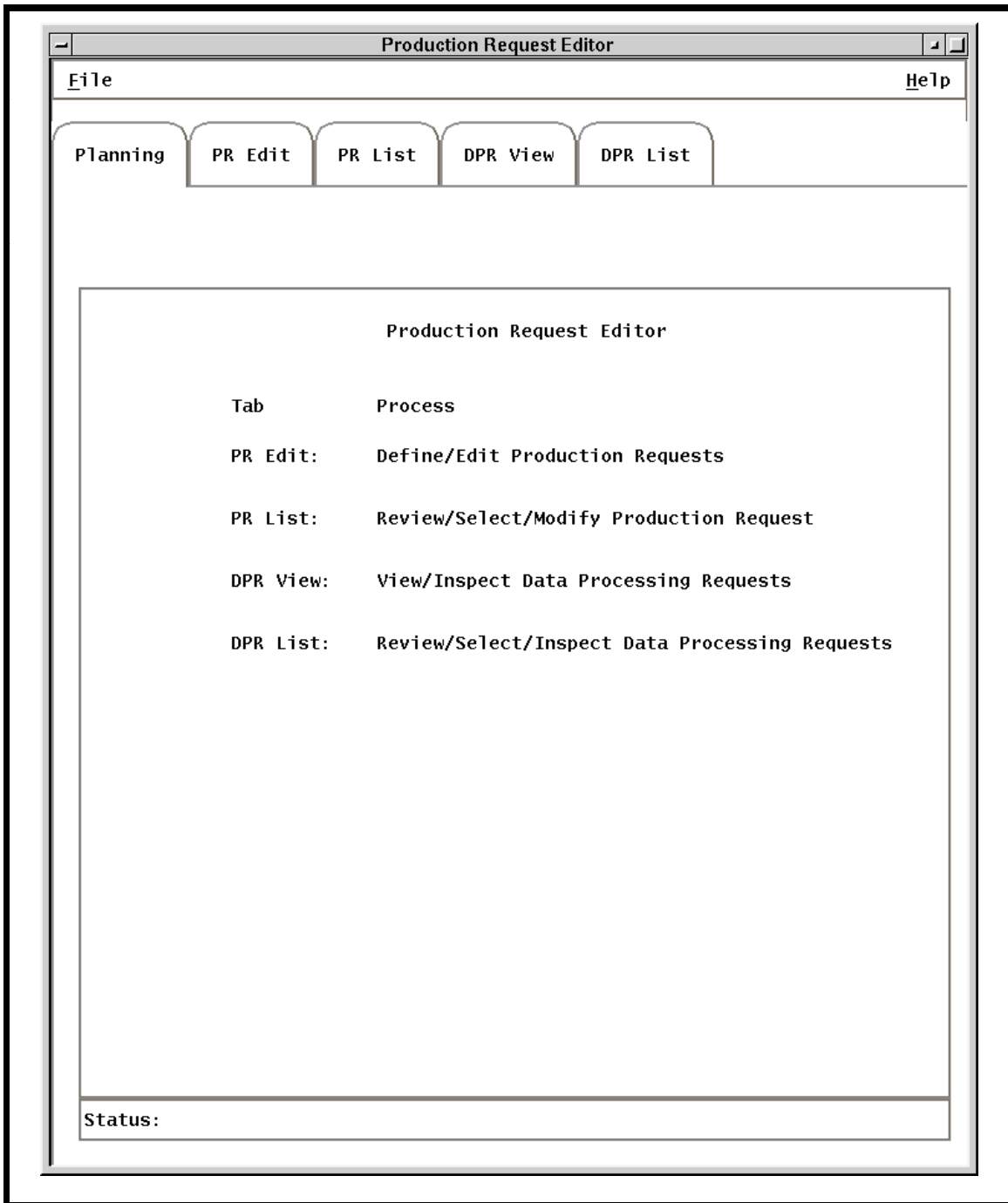
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**NOTE:** Commands in Steps 1 through 10 are typed at a UNIX system prompt.

- 1 Access the command shell.
  - The command shell prompt is displayed.
- 2 Type **xhost** + then press the **Return/Enter** key on the keyboard.
- 3 Open another UNIX window.
- 4 Start the log-in to the planning server by typing either **telnet *servername*** (e.g., **plnn1sun**), **rlogin *servername***, or **rsh *servername*** in the second window then press the **Return/Enter** key.
  - If you use the **telnet** command, a **Login:** prompt appears; continue with Step 5.
  - If you use either the **rlogin** or **rsh** command, the system uses the User ID currently in use; go to Step 6.
- 5 If a **Login:** prompt appears, log in as yourself by typing your **UserID** then pressing the **Return/Enter** key.
- 6 At the **Password:** prompt type your **Password** then press the **Return/Enter** key.

- 7 Type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.
  - It is recommended that you use the terminal/workstation IP address instead of the machine-name for the *clientname*.
- 8 Type **cd */path*** then press **Return/Enter**.
  - Change directory to the directory (e.g., */home/kummerer/ssit/ProductionRequestEditor*) containing the Production Request Editor set-up file (i.e., *PR\_Setup.com*).
- 9 Type **source PR\_Setup.com** then press **Return/Enter**.
  - The **source** command sets the environment variables.
- 10 Type **PREditor** then press **Return/Enter** to launch the Production Request Editor GUI.
  - The **Production Request Editor Introductory** GUI (Figure 2) is displayed.
- 11 Select the Production Request Editor by clicking (single click) on the **PR Edit** tab.
  - The **PR Edit** GUI page (Figure 3) is presented.
- 12 Type your *UserID* in the **Originator** field.
  - The **Origination Date** field will be automatically filled when the Production Request is saved at the end of the procedure. (You do not need to fill in this field.)
- 13 Type the priority for the PR in the **Priority** field.
  - Remember that the job **Priority** field specifies the priority of the job with 1 (one) as the highest priority and 99 the lowest priority.
- 14 Click on the **PGE...** button.
  - The **PGE Selection** GUI (Figure 4) is displayed.
- 15 Select the desired PGE from the list by clicking on the appropriate row in the table.
  - The PGE list is scrollable. (If there are items on the list in addition to those currently visible in the window, the additional items can be viewed by clicking on the arrows associated with the scrollbars.)





**Figure 2. Production Request Editor Introductory GUI**

Production Request Editor

File

Edit

Help

Planning

PR Edit

PR List

DPR View

DPR List

Production Request Identification

Origination Date:

#N/A

PR Name:

New

Originator:

Request Definition

Satellite Name:

None

Priority:

0

Instrument Name:

None

PGE ...

PGE Name:

None

PGE Parameters...

PGE Version:

None

Duration

Start:

Date:

Time:

End:

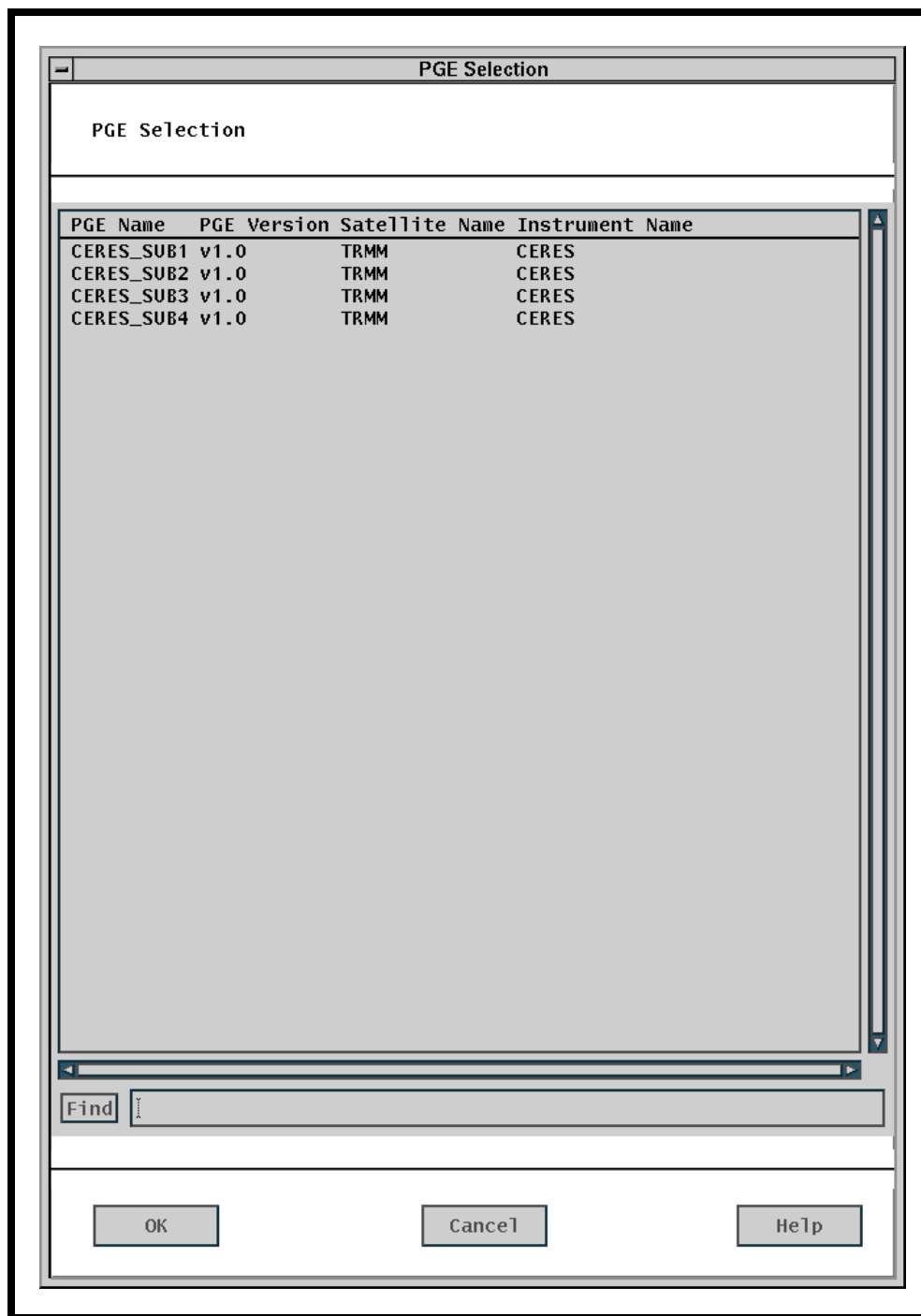
Date:

Time:

Comment:

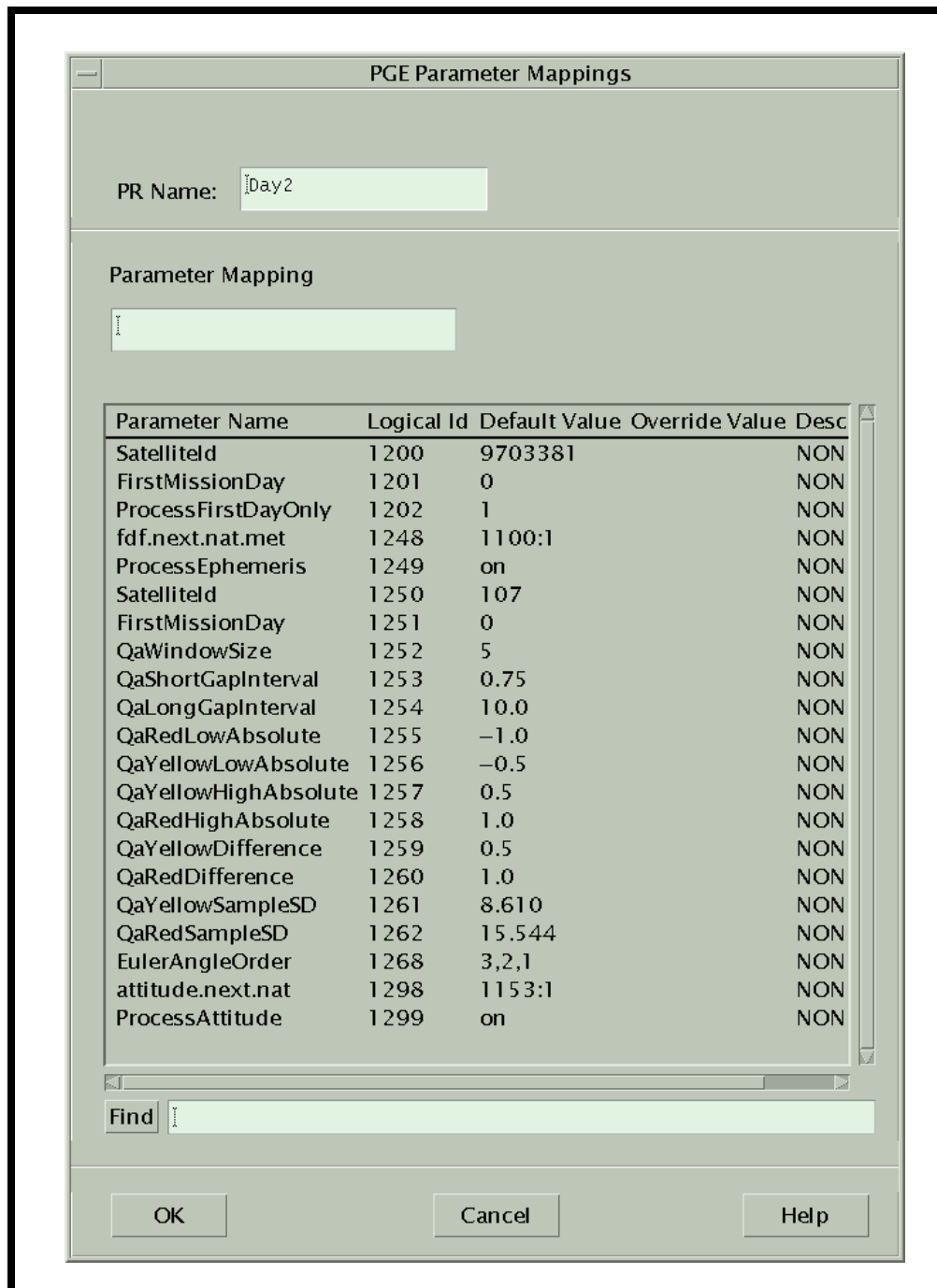
Status:

**Figure 3. PR Edit GUI**



**Figure 4. PGE Selection GUI**

- 16 Click on the **OK** button.
- The **Production Request - PR Edit** GUI page (Figure 3) is displayed.
  - The following fields are automatically filled:
    - **Satellite Name**
    - **Instrument Name**
    - **PGE Name**
    - **PGE Version**
- 17 Click on the **PGE Parameters...** button.
- The **PGE Parameter Mappings** GUI (Figure 5) is displayed.
  - The **PGE Parameter Mappings** GUI has a table that lists the following information:
    - **Parameter Name.**
    - **Logical Id.**
    - **Default Value.**
    - **Override Value.**
    - **Description.**
- 18 If any PGE parameter(s) should be changed, select (highlight) a parameter to be changed by clicking on the corresponding row in the list of parameters.
- The parameter row is highlighted.
  - If you do not change the parameters, the values in the Default column will be used.
  - The PGE parameter mappings list is scrollable.
- 19 Type the desired value in the **Parameter Mapping** field.
- The value in the **Override Value** column is updated.
  - If any other parameter is to be changed, highlight it and type the desired value in the Parameter Mapping field.
- 20 Click on the **OK** button to approve the changes.
- The **Production Request - PR Edit** GUI (Figure 3) is displayed.
- 21 Type the desired start date (in **MM/DD/YY** format) in the **Duration — Start — Date** field, then press the **Tab** key on the keyboard to advance to the next field.
- 22 Type the desired start time (in **hh:mm** format) in the **Duration — Start — Time** field, then press the **Tab** key on the keyboard to advance to the next field.



**Figure 5. PGE Parameter Mappings GUI**

- 23 Type the desired end date (in *MM/DD/YY* format) in the **Duration — End — Date** field, then press the **Tab** key on the keyboard to advance to the next field.
  - 24 Type the desired end time (in *hh:mm* format) in the **Duration — End — Time** field, then press the **Tab** key on the keyboard to advance to the next field.
  - 25 Type any relevant comments in the **Comments** field.
  - 26 Select **Save As** from the **File** pull-down menu (**File** → **Save As**).
  - 27 Type a filename for the production request in the **Selection** field then click on the **OK** button to save the production request.
    - The Production Request is saved.
    - The **Origination Date** and **Originator** fields are automatically updated.
    - If no PR name has been entered in the **PR Name** field, you will be prompted to enter a PR name during the “Save” process.
  - 28 Select **File** → **New** to clear the entries on the Production Request Editor GUI.
    - Return to Step 11 to create another new PR.
  - 29 Select **File** → **Exit** to quit the Production Request Editor GUI.
    - The UNIX window is available for entering other commands.
- 

There is a quick-step version of the preceding procedure. Do not use the quick-step procedure until you have become very familiar with creating new production requests.

It is also possible to create a new PR by editing or modifying an existing PR and renaming it. This is particularly quick and useful if there are only minor differences between the existing PR and the new one.

## Editing or Modifying a Production Request

This section explains how to edit or modify a Production Request.

Before you make any changes to a PR, you must know what needs to be changed. You can change any of the following attributes of the PR:

- Name of the PR (creates a new PR).
- Priority of the PR.
- PGE to be used in processing the PR.
- PGE parameters to be used.
- Start Date.

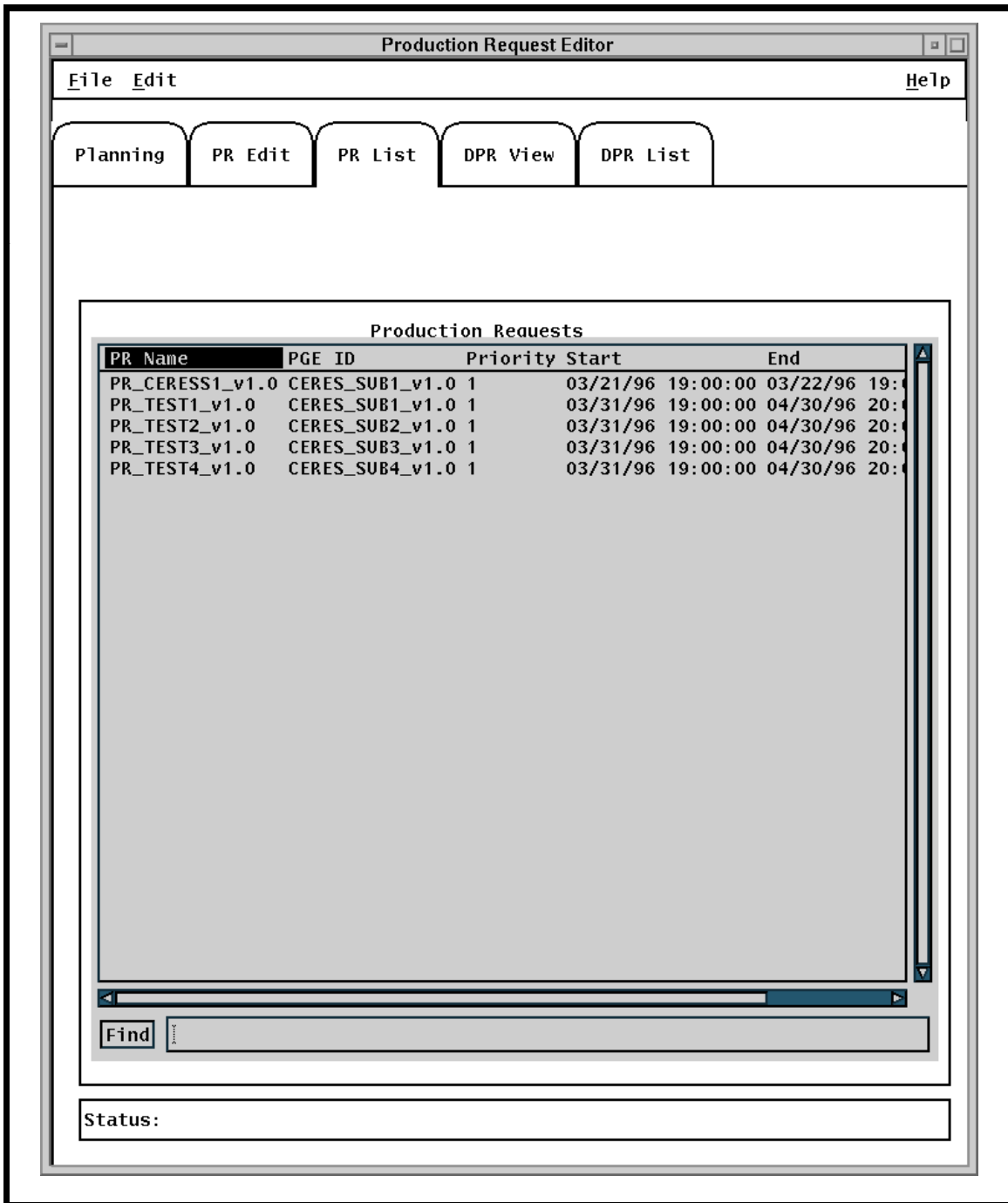
- Start Time.
- End Date.
- End Time.
- Comments (if applicable).

To edit/modify a new Production Request by the Production Planner, execute the procedure steps that follow. Perform only those steps of the procedure that are applicable to the changes you want to make. You do not have to go through all of the fields in the PR to successfully modify it. However, you must save the modified PR (Steps 20 and 21) to make the changes effective.

### Editing/Modifying a Production Request

---

- 1 Launch the Production Request Editor as described in Steps 1 through 10 of the procedure for **Creating a New Production Request**.
  - The **Production Request Editor Introductory** GUI (Figure 2) is displayed.
- 2 Select the Production Request List by clicking on the **PR List** tab.
  - The **PR List** GUI page (Figure 6) is presented.
  - The PR list is scrollable.
- 3 Identify a Production Request to be edited/modified from those shown in the list of Production Requests, then click on the **PR Edit** tab.
  - The **PR Edit** GUI page (Figure 3) is displayed.
- 4 Select **File** → **Open** from the pull-down menu to display a list of Production Requests from which to select the PR to be opened.
  - The list of Production Requests is displayed.
- 5 Select (highlight) the PR to be edited/modified by clicking on the corresponding PR name in the list of PRs.
- 6 Click on the **OK** button.
- 7 If the PR's priority is to be changed, type the new priority in the **Priority** field.
  - Remember that the job **Priority** field specifies the priority of the job with 1 (one) as the highest priority and 99 the lowest priority.
- 8 If the PGE is to be changed, click on the **PGE...** button.
  - The **PGE Selection** GUI (Figure 4) is displayed.
  - Perform Steps 9 and 10 to designate the new PGE.
- 9 Select the desired PGE by clicking on the appropriate row in the table.



**Figure 6. PR List GUI**



- 10 Click on the **OK** button.
  - The **Production Request - PR Edit** GUI page (Figure 3) is displayed.
  - The following fields are automatically filled:
    - **Satellite Name**
    - **Instrument Name**
    - **PGE Name**
    - **PGE Version**
- 11 If any PGE parameter(s) should be changed, click on the **PGE Parameters...** button.
  - The **PGE Parameter Mappings** GUI (Figure 5) is displayed.
  - Perform Steps 12 through 14 to designate the new PGE parameter(s).
- 12 Select (highlight) a parameter to be changed by clicking on the corresponding row in the list of parameters.
  - The parameter row is highlighted.
  - If you do not change the parameters, the values in the Default column will be used.
- 13 Type the desired value in the **Parameter Mapping** field.
  - The value in the **Override Value** column is updated.
  - If any other parameter is to be changed, highlight it and type the desired value in the Parameter Mapping field.
- 14 Click on the **OK** button to approve the changes.
  - The **Production Request - PR Edit** GUI (Figure 3) is displayed.
- 15 If the PR's start date is to be modified, type the desired date (in **MM/DD/YY** format) in the **Duration — Start — Date** field, then press the **Tab** key on the keyboard to advance to the next field.
- 16 If the PR's start time is to be modified, type the desired time (in **hh:mm** format) in the **Duration — Start — Time** field, then press the **Tab** key on the keyboard to advance to the next field.
- 17 If the PR's end date is to be modified, type the desired date (in **MM/DD/YY** format) in the **Duration — End — Date** field, then press the **Tab** key on the keyboard to advance to the next field.
- 18 If the PR's end time is to be modified, type the desired time (in **hh:mm** format) in the **Duration — End — Time** field, then press the **Tab** key on the keyboard to advance to the next field.

- 19 Type any relevant comments in the **Comments** field.
  - 20 Select **Save As** from the **File** pull-down menu (**File** → **Save As**).
  - 21 Type a filename for the production request in the **Selection** field then click on the **OK** button to save the production request.
    - The Production Request is saved.
    - The **Origination Date** field is automatically updated.
    - If no PR name has been entered in the **PR Name** field, you will be prompted to enter a PR name during the “Save” process.
  - 22 Select **File** → **New** to clear the entries on the Production Request Editor GUI.
    - Return to Step 2 to edit/modify another PR.
  - 23 Select **File** → **Exit** to quit the Production Request Editor GUI.
    - The UNIX window is available for entering other commands.
- 

There is a quick-step version of the preceding procedure. In general you should avoid using quick-step procedures until you have become very familiar with normal procedures.

# Creating a New Production Plan

---

## Creating and Activating a Production Plan

The Production Planner uses the Planning Workbench when creating a plan for production data processing at the DAAC. The Planning Workbench provides the means by which the Production Planner selects specific PRs whose DPRs are to be run. The planning tool provides a forecast of the start and completion times of the jobs based upon historical experience in running these PGEs. Through the planning tool, when the generated plan is “activated,” the information included in the plan is transferred to the Data Processing Subsystem and loaded into the Platinum AutoSys tool where production processing is managed. Figure 7 shows the general flow of production requests/data processing requests from the Production Request Editor through the Planning Workbench to the AutoSys production management tool (as well as resource planning, which is not supported in the Pre-Release B Testbed). Figure 8 presents a simplified view of the flow through the Planning and Data Processing Subsystem (PDPS).

The Production Planner creates a production plan by selecting PRs from two lists of PRs, i.e., the list of available “Unscheduled” PRs and the list of “Scheduled” PRs. Using arrow buttons, the Production Planner moves the PRs between lists until the “Scheduled” list contains the desired set of PRs that define the new plan.

Before creating a new production plan the Production Planner must have available the following information:

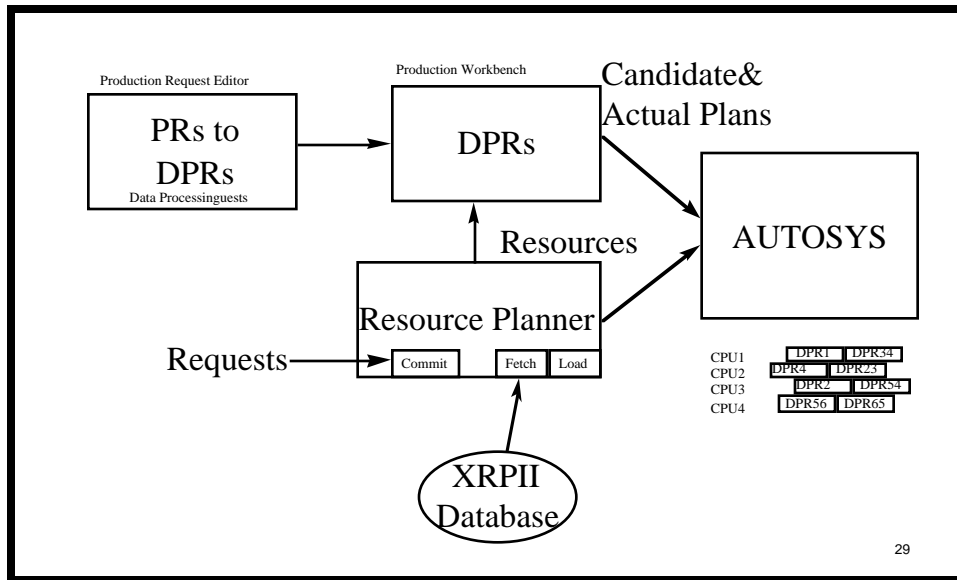
- Name of the plan.
- Comments (if any).
- PRs to be included in the new production plan.

## Creating a New Production Plan

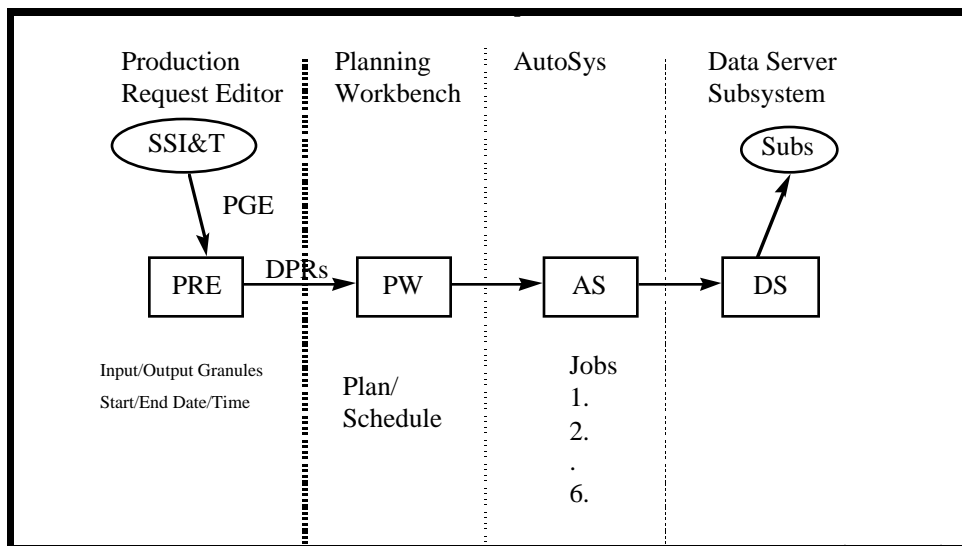
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**NOTE:** Commands in Steps 1 through 16 are typed at a UNIX system prompt.

- 1 Access the command shell.
  - The command shell prompt is displayed.
- 2 Type **xhost** + then press the **Return/Enter** key on the keyboard.
- 3 Open another UNIX window.

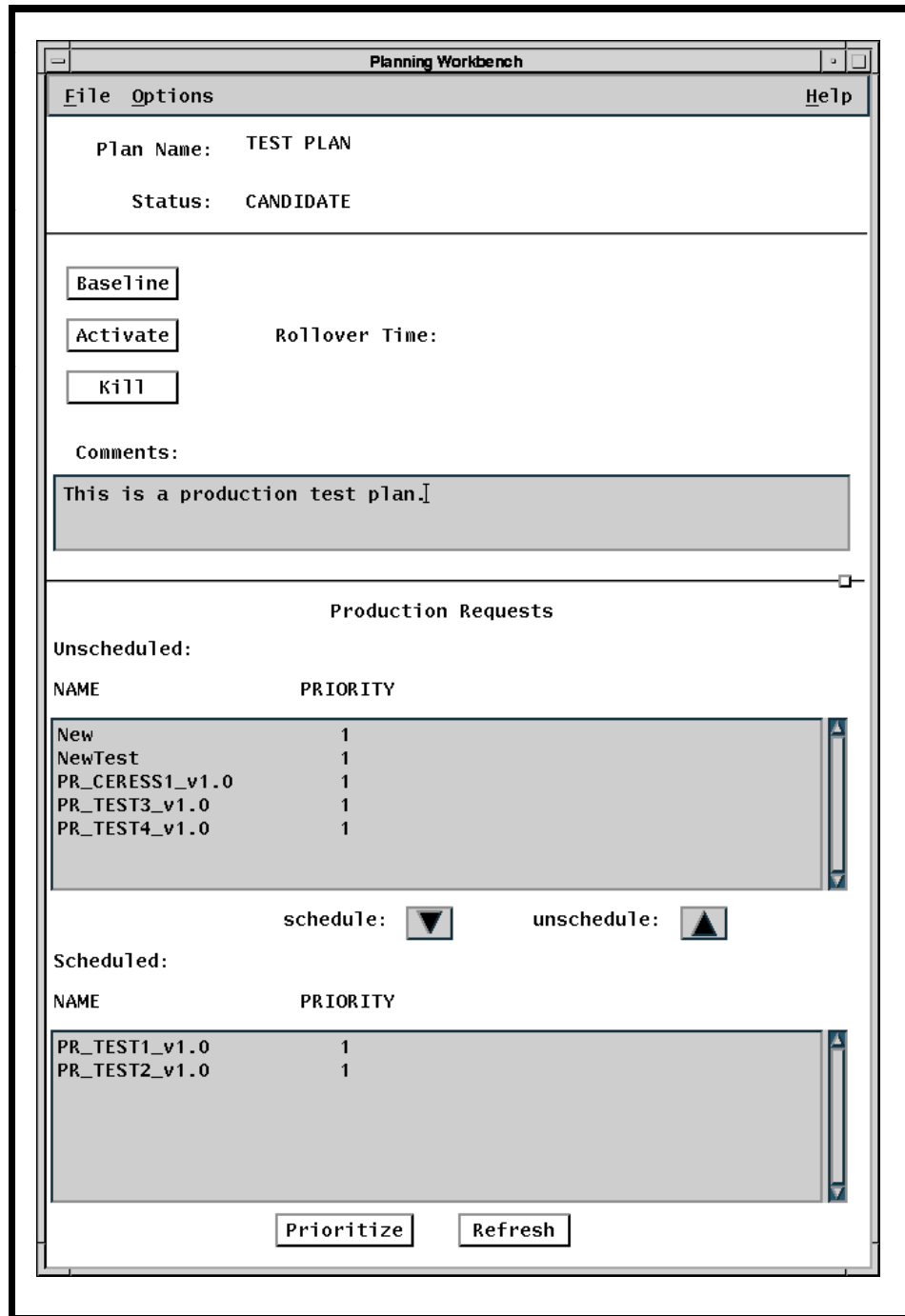


**Figure 7. Planning Workbench Flow**



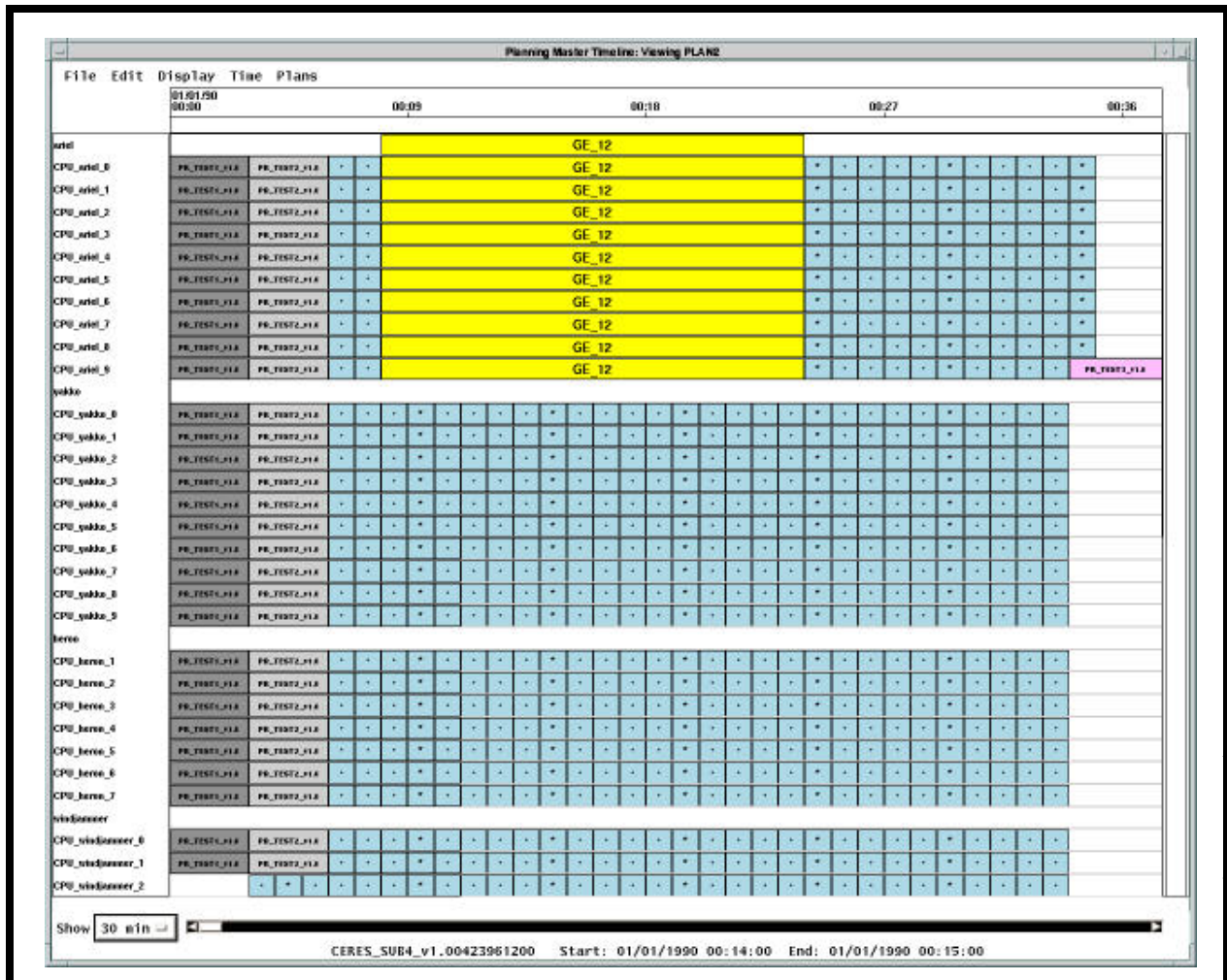
**Figure 8. PDPS Simplified Flow**

- 4 Start the log-in to the planning server by typing either **telnet *servername*** (e.g., **plnn1sun**), **rlogin *servername***, or **rsh *servername*** in the second window then press the **Return/Enter** key.
  - If you use the **telnet** command, a **Login:** prompt appears; continue with Step 5.
  - If you use either the **rlogin** or **rsh** command, the system uses the User ID currently in use; go to Step 6.
- 5 If a **Login:** prompt appears, log in as yourself by typing your **UserID** then pressing the **Return/Enter** key.
- 6 At the **Password:** prompt type your **Password** then press the **Return/Enter** key.
- 7 Type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.
  - It is recommended that you use the terminal/workstation IP address instead of the machine-name for the ***clientname***.
- 8 Type **cd */path*** then press **Return/Enter**.
  - Change directory to the directory (e.g., **/home/kummerer/ssit/PlanningWorkbench**) containing the Planning Workbench set-up file (i.e., **PLWB\_Setup.com**).
- 9 Type **source PLWB\_Setup.com** then press **Return/Enter**.
  - The **source** command sets the environment variables.
- 10 Type **st\_all.*xxxx*.csh** (where ***xxxx*** = **larc**, **nsidc**, **edc** or **gsfc**, as applicable) then press **Return/Enter**.
  - The **Message Handler** window is displayed first.
  - Eventually the **Planning Workbench** GUI (Figure 9) is displayed.
- 11 Click on the UNIX window to reactivate it.
- 12 Type **st\_pltl.*xxxx*.csh** (where ***xxxx*** = **larc**, **nsidc**, **edc** or **gsfc**, as applicable) then press **Return/Enter**.
  - The **Planning Timeline** is activated.
- 13 Click on the **Planning Workbench** GUI to reactivate it.
  - Data concerning the currently active production plan are displayed.
  - If you want to “kill” (deactivate) the currently active production plan without activating a replacement, click on the **Kill** button.
  - Whenever you activate a plan (by clicking on the **Activate** button), you automatically “kill” the currently active plan.
- 14 Select **File** → **New** from the pull-down menu.
  - The “New” window appears.



**Figure 9. Planning Workbench GUI**

- 15 Type a name for the new plan, then click on the **OK** button.
  - The **Planning Workbench** GUI is displayed.
  - The **Plan Name** is displayed.
  - The **Status** displayed is **Candidate**.
- 16 Type any relevant comments (up to 255 characters) in the **Comments** field.
- 17 Move PRs between the **Unscheduled** and **Scheduled** lists as necessary by selecting (highlighting) the PR to be moved by clicking on the PR in the list from which it is to be moved then clicking on the up or down arrow button (as applicable) to move the PR to the other list.
  - Highlighted PR disappears from one list and appears on the other.
  - The unscheduled and scheduled PR lists are scrollable.
- 18 When the **Scheduled** list accurately reflects the PRs to be scheduled in the production plan, select **File** → **Save** (or **File** → **Save As**) from the pull-down menu to save the new production plan.
- 19 Verify that the name for the new production plan is correct, then click on the **OK** button.
  - The new production plan is saved.
- 20 If the new plan is to be activated immediately, click on the **Activate** button to activate the new plan.
  - The currently active plan is killed (deactivated) and the new plan is activated.
  - The **Production Planning Timeline** GUI (Figure 10) is displayed.
- 21 If the new production plan is to be used as a baseline plan, click on the **Baseline** button.
  - The “New” window appears.
  - The plan is recorded as well as the time of baselining so that it can be used in comparing future processing results with planned objectives.
- 22 If the production plan being displayed is active and should be deactivated, click on the **Kill** button.
  - The “New” window appears.
  - The plan is deactivated without activating another plan.
- 23 Select **File** → **Exit** to quit the Planning Workbench GUI.
  - The UNIX window is available for entering other commands.



**Figure 10. Production Planning Timeline GUI**

**24** At the UNIX prompt type **slay\_all.csh** then press **Return/Enter**.

- All Planning Workbench-related applications are closed.

There is a quick-step version of the preceding procedure. Do not use the quick-step procedure until you have become very familiar with creating new production plans.



# Reviewing Data Processing Requests

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## Data Processing Requests

Data Processing Requests (DPRs) are generated automatically by the PDPS.

- DPR is generated automatically from...
- a PR (which specifies a PGE).
- information on the PGE acquired during the Science Software Integration and Test (SSI&T) process.
- DPRs are complex, reflecting the complexity of the PGEs.
- DPRs contain information that is used by the Data Processing Subsystem and the AutoSys production scheduling software.

The Production Planner can review DPRs.

- DPRs may provide useful information.
- DPR fields cannot be edited by M&O personnel.
  - Modifications to DPR information would have undesirable side-effects.

## Displaying DPR Information

The Production Request Editor can display DPR information in two ways:

- DPR List.
- Data concerning an individual DPR.

The following characteristics pertain to the DPR List:

- Each line of the DPR List display represents a DPR, i.e., a job that will be run when all data and resource needs have been satisfied.
- For each DPR the list includes the DPR identification, relevant PGE, name of the corresponding PR, data start date and time, etc.
- The DPR list may be filtered, so that only DPRs with certain characteristics are displayed.
  - For example, the Production Planner may be interested in reviewing only those DPRs associated with a particular PR.

By selecting a particular DPR on the DPR List, the Production Planner can obtain data on that DPR, especially the following characteristics:

- PGE parameters
  - displayed in the same format as the **PGE Parameter Mappings** GUI (Figure 5) used in creating a PR.
- PGE File Mappings (UR File Mappings)
  - displays the input and output files for a particular DPR on the **UR File Mappings** GUI (Figure 11)
  - GUI displays one line of information for each file that may be used by or be produced by the PGE, including the following data:
    - Logical ID - The identification (ID) or tag used within the PGE to access the file.
    - Granule ID - The reference used to identify the granule uniquely.
    - Start/Stop Time - The start or stop date and time for the data contained in this file.
    - Availability - Flag indicating whether or not the data file is known to be accessible to be staged for use in processing.
    - UR (Universal Reference) - The uniform reference for each object associated with the Science Data Processing Segment (SDPS) that allows each SDPS service to understand and support the object.

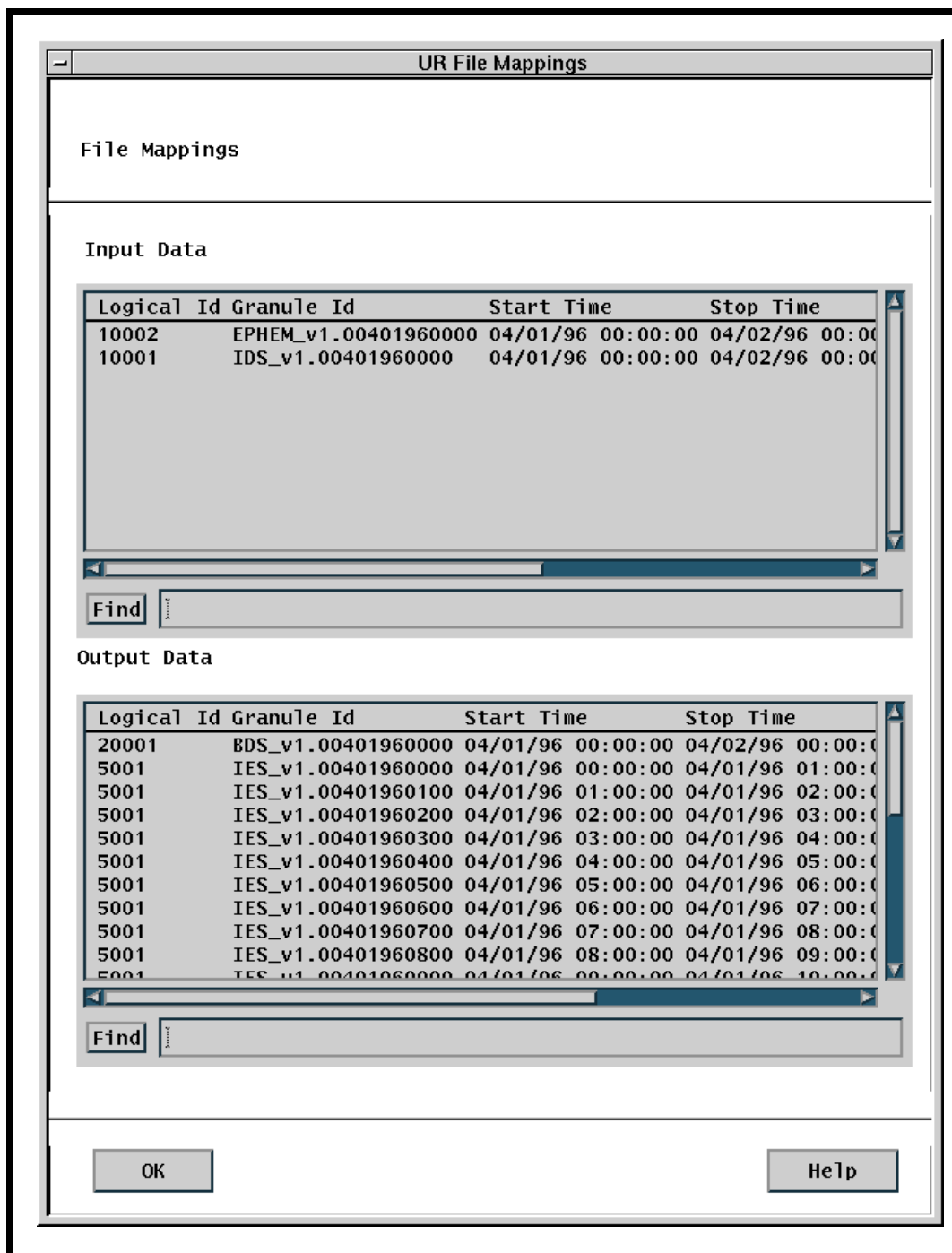
Before reviewing a DPRs the Production Planner must know the name of the PR that caused the system to generate the DPRs.

The process of reviewing DPRs begins with the Production Planner starting the Production Request Editor from a UNIX prompt. The Production Planner specifies the name of the PR that led to the generation of the DPRs to be reviewed. In addition, the Production Planner can review DPR Predicted and Actual Start Times, Data Start Time, Status and Priority.

## Reviewing Data Processing Requests

---

- 1 Launch the Production Request Editor as described in Steps 1 through 10 of the procedure for **Creating a New Production Request**.
  - The **Production Request Editor Introductory** GUI (Figure 2) is displayed.



**Figure 11. UR File Mappings GUI**

- 2 Select the **Data Processing Request List** by clicking on the **DPR List** tab.
  - The **DPR List** GUI page (Figure 12) is displayed.
  - The table shown on the GUI provides the following information on the DPRs:
    - **DPR Id** - identification (name) of the DPR.
    - **PGE Id** - identification of the PGE specified in the DPR.
    - **PR Name** - name of the PR that led to the creation of the DPR.
    - **Data Start Time** - DPR's start date and time.
    - **Data Stop Time** - DPR's stop date and time.
- 3 To list only the DPRs associated with a particular Production Request, first click on the option button associated with the **Production Request** field.
  - An option menu of Production Requests is displayed.
- 4 Highlight the desired PR in the option menu then click on the **Filter** button.
  - The DPRs for the specified PR only are shown in the **DPR List**.
  - An alternative method of filtering PRs is to type the name of the PR in the **Production Request** field then click on the **Filter** button.
- 5 Identify a DPR to be reviewed from those shown in the list of Data Processing Requests, then click on the **DPR View** tab.
  - The **DPR View** GUI (Figure 13) is displayed.
- 6 Select **File** → **Open** from the pull-down menu to display a list of Data Processing Requests from which to select the DPR to be opened.
  - The list of Data Processing Requests is displayed.
- 7 Select (highlight) the DPR to be edited/modified by clicking on the corresponding DPR name in the list of DPRs.
- 8 Click on the **OK** button.
  - The **DPR View** GUI shows the following information concerning the selected DPR:
    - **DPR Name**.
    - **PR Name**.
    - **Origination Date**
    - **Originator**
    - **PGE Id**.
    - **Data Start Time**.

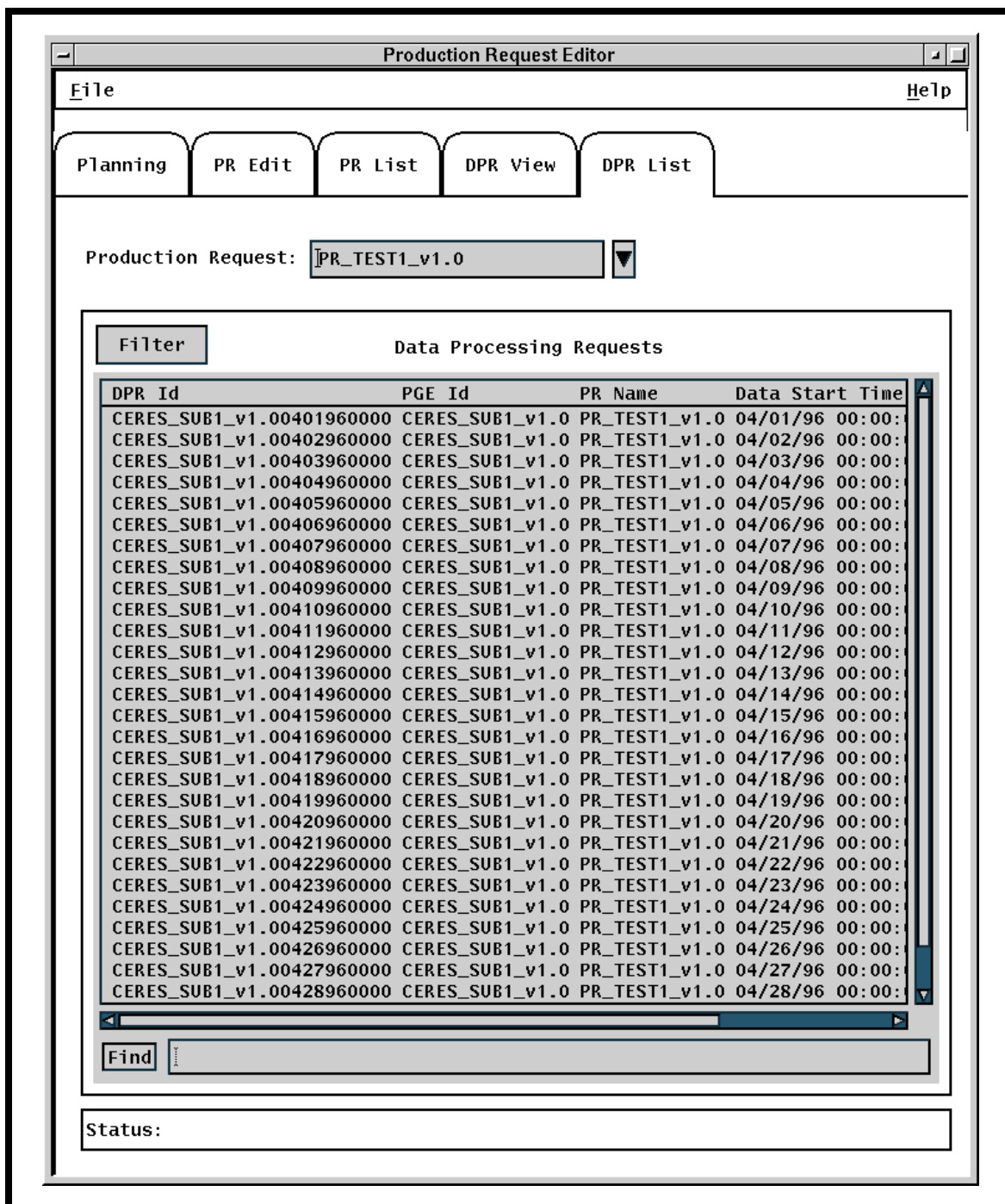


Figure 12. DPR List GUI

Production Request Editor

File

Help

Planning

PR Edit

PR List

DPR View

DPR List

Data Processing Request Identification

DPR Name: CERES\_SUB1\_v1.004019600

PR Name: PR\_TEST1\_v1.0

Origination Date: 07/23/96 08:46:37

Originator: jolyon

PGE ID: CERES\_SUB1\_v1.0

Data Start Time: 03/31/96 19:00:00

Data Stop Time: 04/30/96 20:00:00

PGE Parameters...

PGE File Mappings...

Request Data and Status

Predicted Start

Date: #N/A

Time:

Actual Start:

Date: #N/A

Time:

Priority: 0

Status: ON\_QUEUE

**Figure 13. DPR View GUI**

36

456-TP-003-001

- **Data Stop Time.**
  - **Predicted Start Date.**
  - **Predicted Start Time.**
  - **Actual Start Date.**
  - **Actual Start Time.**
  - **Priority.**
  - **Status.**
- 9** To obtain information concerning the PGE parameters (of the PGE associated with the DPR), click on the **PGE Parameters...** button.
- The **PGE Parameters** GUI (same format as Figure 5 except there is no **Parameter Mapping** field) is displayed.
- 10** When finished reviewing the PGE parameters, click on the **OK** button to return to the **DPR View** GUI.
- The **DPR View** GUI (Figure 13) is displayed.
- 11** Click on the **PGE File Mappings...** button.
- The **UR File Mappings** GUI (Figure 11) is displayed.
  - The **UR File Mappings** GUI displays one line of information for each file that may be used by or be produced by the PGE associated with the selected DPR:
    - **Logical Id.**
    - **Granule Id**
    - **Start Time** (date and time).
    - **Stop Time** (date and time).
    - **Availability.**
    - **UR** (universal reference).
  - The PGE's input data and output data are displayed in separate areas.
- 12** When finished reviewing the **UR File Mappings**, click on the **OK** button to return to the **DPR View** GUI.
- The **DPR View** GUI is displayed.
- 13** Review the **Data Start Time** and **Data Stop Time**.

- 14** Review the **Request Data and Status** area of the GUI.
- The **DPR View** GUI displays the following information concerning the selected DPR:
    - **Predicted Start Date and Time.**
    - **Actual Start Date and Time.**
    - **Priority.**
    - **Status.**
  - **Predicted Start Date/Time** and **Actual Start Date/Time** are displayed only if the Production Request has been scheduled.
- 15** When finished reviewing information concerning the DPR, repeat Steps 2 through 14 to review additional DPRs.
- 16** Select **File** → **Exit** to quit the Production Request Editor GUI.
- The UNIX window is available for entering other commands.
-



# Reviewing a Plan Timeline

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## Production Plan Timeline

A graphic, timeline-oriented depiction of a production plan, as shown in Figure 10, can be displayed. The timeline application is available and minimized when the Production Planning Workbench is initiated. When the minimized timeline application object is selected, the production plan timeline graphic is displayed.

The display represents a set of computers, arranged along the left side of the GUI, and some period of time as indicated across the top edge of the GUI. The execution of DPRs on a computer over a period of time is represented by several DPR bars across the GUI for that computer. A bar represents a time period during which a PGE (as described by a DPR) is running. Each bar has the name of the PGE. Scroll bars allow scrolling up and down through the full list of computers and left and right in time.

## Reviewing a Plan Timeline

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[TBD]

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# Production Planning Scenarios

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The following two scenarios from the *Operations Scenarios for the ECS Project: Release A*, 605-CD-001-003, June 1996, illustrate production planning:

- Routine Production Planning Scenario
- Replanning Production Scenario

## Routine Production Planning Scenario

This scenario occurs during a given day of the Release A period at the Langley Research Center (LaRC) DAAC under the following conditions:

- The system at the DAAC is in stable operations.
- The following components are all operating normally:
  - TRMM instruments (including CERES).
  - Sensor Data Processing Facility (SDPF).
  - ECS Ingest Subsystem.
- Pertinent PGEs have been integrated into the ECS production processing environment and are operating normally.

The scenario describes the process for the development of plans for production processing at the LaRC DAAC. The following three planning time cycles are described in this scenario:

- monthly plan.
- weekly plan
- daily plan/schedule.

The time-frames identified here indicate a possible scheme for the generation of these plans. It is the intent that the production planning tool be flexible enough in its design to support the particular planning and scheduling cycles of the operations organization of each DAAC.

The scenario describes the addition of a Production Request into the Planning and Data Processing System (PDPS) database. This is not a routine activity but is described here for the sake of covering other operator interfaces that have a bearing on the routine production planning activity.

The Production Planner prepares a monthly and weekly production plan. In addition, the Production Planner develops a daily production schedule from the most current weekly plan.

Monthly plans are developed for the coming month and one or two months in advance.

- The monthly plans are generally produced, reviewed, updated and published/distributed approximately two weeks before the beginning of the month.
- The monthly plan for the coming month is used to establish a baseline against which production targets can be measured.

Weekly plans are developed for the coming week.

- Weekly plans are produced, reviewed, updated and published/distributed approximately five days before the beginning of the coming week.
- The weekly plan is used to produce a baseline for comparison of planned vs. actual production results.

A daily plan or schedule is produced each day for the next processing day.

- The daily schedule is developed from the current weekly plan, adjusted to reflect the actual processing accomplished and the actual resources available at the time of the daily schedule generation.

The LaRC DAAC will be operating on a 16-hour per day processing schedule during the Release A period.

The Production Planner sends the next 16 hour portion daily production schedule to Data Processing Subsystem (DPS), representing the processing workload for the day.

In the current scenario, the Instrument Team (IT) for the CERES instrument has a standing agreement with the Production Planner to input a PR covering a one-month period every month. The IT reviews the quality of the products on a monthly basis and provides any changes to the PR. Changes may include such items as the following factors:

- discontinue PR.
- change time ranges.
- modify input parameters.

The IT provides changes to the planner via e-mail prior to the time that the PR should be updated. For the last several months, there have been no changes to the PR other than to reissue it for continued processing.

The scenario is based on the assumption that all of the following conditions have been met:

- All resource allocation issues have been resolved with the Resource Planner.
- The Resource Planner has provided the Production Planner with the following items:
  - list of resources available for use in processing.
  - allocation profile with time for the available resources.

- The PDPS database is complete in terms of PRs, DPRs and data availability predictions, etc. and is ready to support the planning activity.
- Subscriptions have been entered against all data products required for processing.

The following steps have been extracted and adapted from the scenario:

1. The Production Planner reviews objectives for processing for the coming month.
  - Production planning considerations include the following factors:
    - science software stability.
    - Instrument Team input.
    - project directives.
  - The Production Planner notes that the current PR for a CERES product is due to expire.
  - The IT for CERES has requested that the PR be reissued for the next month.
2. The Production Planner starts the **Production Request Editor** from the normal Production Planner's desktop and selects the option to access existing PRs.
  - The **PR List** GUI is displayed.
3. The Production Planner selects the PR to be reissued from the **PR List** GUI and opens the **PR Edit** GUI to make modifications to the PR.
  - The **PR Edit** GUI is displayed.
  - The Production Planner uses the existing PR as a template for a new PR, which will have a new name and revised start and stop dates.
  - The system uses the new PR to generate a series of DPRs.
    - Each DPR corresponds to the execution of a single PGE.
    - The availability of data required for each DPR is checked, either from the data server (if the data have been previously ingested) or from internal predictions as to when the data can be expected.
    - The data to be output from the DPR are calculated to generate predictions of the availability of that data for subsequent PGEs.
4. The Production Planner creates a plan for the coming month using the **Planning Workbench**.
  - The **Planning Workbench** is started from the normal Production Planner's desktop.
5. The Production Planner selects the new plan option.
6. The Production Planner enters the time period (date/time) for the plan [TBD].

7. The Production Planner reviews the available PRs displayed on the **Planning Workbench** GUI.
  - The **Planning Workbench** GUI shows separate lists of unscheduled and scheduled PRs.
8. The Production Planner is uncertain concerning the details of one of the PRs displayed and selects the PR to review the details. [TBD]
9. The Production Planner goes back to the lists of scheduled and unscheduled PRs and moves PRs between the lists until the scheduled list contains the desired PRs.
10. Having selected the applicable PRs for the new Production Plan, the Production Planner activates the plan (using the **Activate** button).
  - The **Production Planning Timeline** GUI is displayed.
11. The Production Planner reviews the **Production Planning Timeline** GUI which was displayed when the Production Planner clicked on the **Activate** button.
  - The system uses the following types of data to develop a monthly plan:
    - list of selected PRs.
    - information concerning the projected run time of the jobs.
    - system resource projections including ground event activities.
    - priorities associated with jobs.
12. The Production Planner reviews the new plan.
  - In this case not all of the intended processing objectives are accomplished as a result of the large amount of ground event time allocated to production resources during the interval for testing purposes.
  - The Production Planner decides to develop a second candidate plan where the priorities of some reprocessing activities are lowered to allow standard processing objectives to be met.
  - The Production Planner is aware that the testing activities will be completed shortly after and that sufficient resources will be available to keep current with standard processing and work off the backlog of reprocessing.
13. The Production Planner exits from the **Production Planning Timeline** GUI, saves the current plan, and returns to plan creation, selecting a PR, modifying its priority level and time period and scheduling it in the modified plan.
  - The Production Planner can prepare and save multiple plans during a planning session.
14. The Production Planner reviews the modified plan.

15. The Production Planner analyzes the results of the modified plan and decides that it achieves the goals. The Production Planner saves the monthly Production Plan.
16. The Production Planner selects a baseline plan (monthly) using the **Planning Workbench** GUI.
  - The baseline plan provides a reference point for “Plan vs. Actual” comparisons.
  - The Planning Workbench creates a tabular representation of the information contained in the plan and transfers the resulting document to the document data server (DDS), where it is available to the public.
17. The Production Planner starts the creation of a weekly Production Plan by opening an existing weekly plan using the **Planning Workbench** GUI.
18. The Production Planner reviews and updates the selected PRs as required on the basis of planning meetings and comments.
19. The Production Planner reviews the **Production Planning Timeline** GUI, decides that the plan meets the objectives and saves the plan.
20. The Production Planner selects a baseline plan (weekly) using the **Planning Workbench** GUI.
  - The baseline plan provides a reference point for “Plan vs. Actual” comparisons.
  - The Planning Workbench creates a tabular representation of the information contained in the plan and transfers the resulting document to the document data server (DDS), where it is available to the public.
21. The Production Planner decides to review and activate the production schedule for the next day of processing.
22. The Production Planner selects the current weekly plan being used for the activation/schedule seeding operation.
  - Information from the current weekly plan will be rolled into the processing system scheduler.
  - The plan for the day is updated to reflect any changes in the PDPS Planning database, such as the status of DPRs that were previously activated for processing, or changes in the resource allocation timeline for processing.
23. The Production Planner enters the time range of the scheduling period, enters any comments and activates the plan.
  - The system creates an ordered list of activities which are currently active in data processing and integrates with it other activities that may be scheduled within the scheduling window or time period.
  - The Planning System processes the list.

- If the DPR is already active (i.e., in the Data Processing System), the entry available to the data processing system is updated to ensure the most current information with possible priority adjustments.
- If the DPR is not active, it is scheduled into the Data Processing System.

24. The Production Planner reviews the resulting schedule and accepts the results.

- The Data Processing System will initiate PGE jobs according to the schedule of jobs transferred from the Planning System.

At the completion of the scenario, the planning database contains new and updated entries reflecting the current state of the Production Plan. The DDS contains the published version of the plan and a timeline view [TBD] of the plan. E-mail messages will have been sent to all affected persons, as determined by the plan insertion or update. The production schedule, as maintained by AutoSys, will have been updated and processing will proceed according to the schedule.

## **Replanning Production Scenario**

This scenario occurs during a given day of the Release A period at the Langley Research Center (LaRC) DAAC when the system at the DAAC is in stable operations. The scenario describes the process for the development of plans for production processing to replace or supersede plans that have already been established.

During normal processing when reasonably accurate predictions of the processing time for the PGEs are available, the processing schedule should result in a good prediction of when data products will be generated. However, several difficult-to-predict or unpredictable factors can affect the planning system's ability to produce a plan with accurate predictions. The following factors may have such effects:

- Equipment failures.
- Emergency or high priority processing.
- Delayed input data.
- PGE faults.
- PGEs with data product-dependent components that affect PGE run time (e.g., the PGE runs long or short when clouds are encountered).
- PGEs with geo-location dependent processing.

In such situations, the plan could depart significantly from what is actually accomplished. In such a situation, the production planner may choose to develop a new plan to reflect the current situation. Note however that this is not essential. Production will continue to process the planned jobs, redirecting jobs to other processors should one fail. Also, if a particular job and data product are important, priorities can be adjusted without replanning to speed up the delivery of the product.



In summary, the frequency of occurrence of replanning is difficult to predict. It is assumed that no more than two planning sessions per day might occur.

The scenario is based on the assumption that all of the following conditions have been met:

- A plan for the processing interval has been developed and activated so that the Processing system contains a queue of jobs and has been processing jobs for some time.
- Because of unexpectedly long run times for some processing jobs, the actual processing accomplished has fallen behind the planned processing.

The following steps have been extracted and adapted from the scenario:

1. In response to the Production Monitor's notification that the planned objectives for the shift are not being met, the Production Planner launches the **Planning Workbench** GUI.
  - The **Planning Workbench** is the mechanism for planning and replanning of production.
  - The **Planning Workbench** seeds the AutoSys job scheduling software with processing jobs.
2. The Production Planner selects and opens the current weekly plan being used for the activation/schedule seeding operation.
  - The plan for the day is updated to reflect any changes in the PDPS Planning database, such as the following factors:
    - status of DPRs that were previously activated for processing.
    - changes in the resource allocation timeline for processing.
  - The impact of the delayed processing as determined from the DPRs' statuses are reflected in the plan for the day.
3. The Production Planner reviews the resulting schedule and works to adjust priorities until the results are acceptable.
  - The Production Planner uses **Planning Workbench** tools to update the plan and view the plan in timeline form.
4. The Production Planner activates the new plan.
  - Information from the updated plan will be rolled into the processing system software scheduler.
  - The system creates an ordered list of activities which are currently active in data processing and integrates with it other activities that may be scheduled within the scheduling window or time period.
  - The Planning System processes the list.

- If the DPR is already active (i.e., in the Data Processing System), the entry available to the Data Processing System is updated to ensure the most current timing information with possible priority adjustments.
  - If the DPR is not active, it is scheduled into the Data Processing System.
5. The Data Processing System will initiate PGE jobs according to the schedule of jobs transferred from the Planning System.

At the completion of the preceding scenario, the planning database contains new and updated entries reflecting the current state of the Production Plan. The Document Data Server contains the published version of the plan and a timeline view [TBD] of the plan. E-mail messages will have been sent to all affected persons, as determined by the plan insertion or update. The production schedule, as maintained by AutoSys, will have been updated and processing will proceed according to the schedule.

# Configuring AutoSys Screens/Displays

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## AutoSys/AutoXpert Production Scheduling Tool

The Planning and Data Processing Subsystem (PDPS) provides a batch processing environment to support the generation of data products. It manages, queues and executes Data Processing Requests (DPR) on the processing resources at a DAAC. The DPRs are submitted from the Planning Subsystem. The PDPS provides the operational interfaces needed to monitor the execution of science software PGEs specified in the DPRs.

The AutoSys/AutoXpert software is a production scheduling tool intended to support the operational activities surrounding production processing in the PDPS. It assists with the following activities (among others):

- job monitoring.
- job scheduling.
- fault notification.
- job restart.
- determining the effects of failure of a DPR.
- determining the cause and actions to be taken due to the failure of a DPR.

The AutoSys scheduling software in the DPS displays DPRs as job boxes. AutoSys recognizes the following three categories of jobs:

- Command jobs.
- Box jobs.
- File-watcher jobs.

A command job is the type most commonly thought of as a “job.” The “command” can be a shell script, the name of an executable program, a file transfer, or any other command that causes execution of a UNIX command on client machine. When all of the starting conditions for the particular job have been met, AutoSys performs the following functions:

- executes the command (runs the job).
- captures the exit code at job completion.
- sends the exit event (success or failure) and code back to the relational database management system (RDBMS).

A box job is a collection of other jobs. It performs no processing action other than providing an organizational structure for a group of jobs that should be run within the same time period. Box jobs can be nested; i.e., box jobs can be included in other box jobs. Box jobs are particularly

useful for organizing, managing, and administering large numbers of jobs which are interrelated or have complex logic flows.

Box jobs are subject to the following rules:

- If no other starting conditions are specified at the job level, a job within a box job runs as soon as the starting conditions for the box are satisfied.
- If there are no job-level starting conditions for some of the jobs in a box, those jobs will run in parallel.
  - The jobs will run only once even if multiple start times are specified for some of the individual jobs.
  - Consequently, jobs in boxes will not be run several times inadvertently.
- Whenever any job in a box changes state, all jobs in the box are checked to see if they are eligible to be run.

A file-watcher job functions in a manner that is similar to a command job; however, it has a special purpose, i.e., to monitor the creation and size of a particular operating system file. When the file has reached a specified minimum size and is no longer increasing in size, the file-watcher job sends AutoSys an event indicating that the file has arrived. The file-watcher job allows AutoSys to know the status of external files that are needed in the processing of command jobs or box jobs.

When determining whether to start a job of any type, AutoSys evaluates the job with respect to the following the following starting parameters:

- Date and time scheduling parameters are met.
- Starting Conditions specified in the job definition evaluate to “true.”
- For jobs in a box, the box must be in the RUNNING state.
- The current status of the job is not ON\_HOLD or ON\_ICE.

Every time there is an event that changes the truth of any of the preceding parameters, AutoSys finds all jobs that may be affected by the change and determines whether or not to start them.

As previously mentioned, AutoSys jobs in the context of ECS are based on the DPRs generated by the Planning Subsystem in response to the Production Planner’s selection of PGEs on a Production Request. When a Production Plan that includes the Production Request is activated, AutoSys creates jobs from the DPRs.

Each DPR represents the execution of a single science software PGE. However, a DPR may depend on the availability (as input) of data produced by another DPR. DPR dependencies result in the following mode of processing:

- Any DPRs that depend on data which are not yet available, are kept in a "held" state by AutoSys until their data availability subscriptions are fulfilled.

- The subscription manager software, which is part of the Planning Subsystem, receives subscription notifications for the DPRs and informs the DPS to release the AutoSys jobs after all data subscriptions for a given DPR are fulfilled.
- The Data Processing Subsystem (as managed by the AutoSys Job Scheduling engine) runs the PGEs and associated jobs as the resources required for the tasks become available.
- The procedure continues until all DPRs scheduled for that day have completed.

The DAAC Production Monitor uses AutoSys/AutoXpert when performing the following functions:

- modifying DPR priorities and inputs as required.
- transferring/deleting/suspending/resuming DPRs as required (e.g., requests, resource problems, input data schedule problems, special events, schedules replans, etc.).
- monitoring and providing processing status upon request.
- monitoring/reviewing input and output data.
- implementing production system reconfiguration in response to operations anomalies.

The Production Monitor can configure some aspects of AutoSys, including the runtime options.

## Configuring AutoSys Runtime Options

This section explains how to configure AutoSys runtime options. The procedure assumes that the Production Monitor has logged into the Production Workbench and the proper desk top environment is being displayed.

The Production Monitor can define the following runtime options:

- Refresh Interval.
- Ping Interval.
- Hang Time.
- Inches/Hr.

The Refresh Interval determines how often the View Region (the area on the right side of the GUI display where data are presented) will be updated. The Ping Interval is defined by how often the connectivity will be evaluated. The Hang Time is the length of time jobs will continue to be displayed within a machine after they have completed running. Inches/Hr specifies how much information is displayed on the screen. There are default values that apply to the runtime options unless the Production Monitor modifies them.

Table 1 lists the runtime options available for HostScape, TimeScape, and JobScape. Not all options are available for all GUI's.

**Table 1. Runtime Options Table**

Interface	Refresh Interval	Hangtime	PING	Inches/Hour
HostScape	X	X	X	
TimeScape	X			X
JobScape	X			

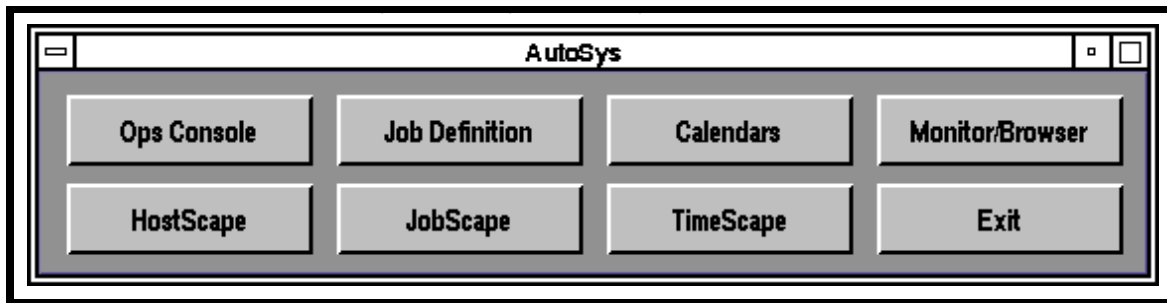
The procedure assumes that AutoXpert HostScape is running. Perform only the steps that are applicable to the changes to be made (as specified in Table 1). Note that if the Freeze Frame feature is enabled, any changes entered will not take place until Freeze Frame has been disabled.

### Configuring AutoSys Runtime Options

**NOTE:** Commands in Steps 1 through 10 are typed at a UNIX system prompt.

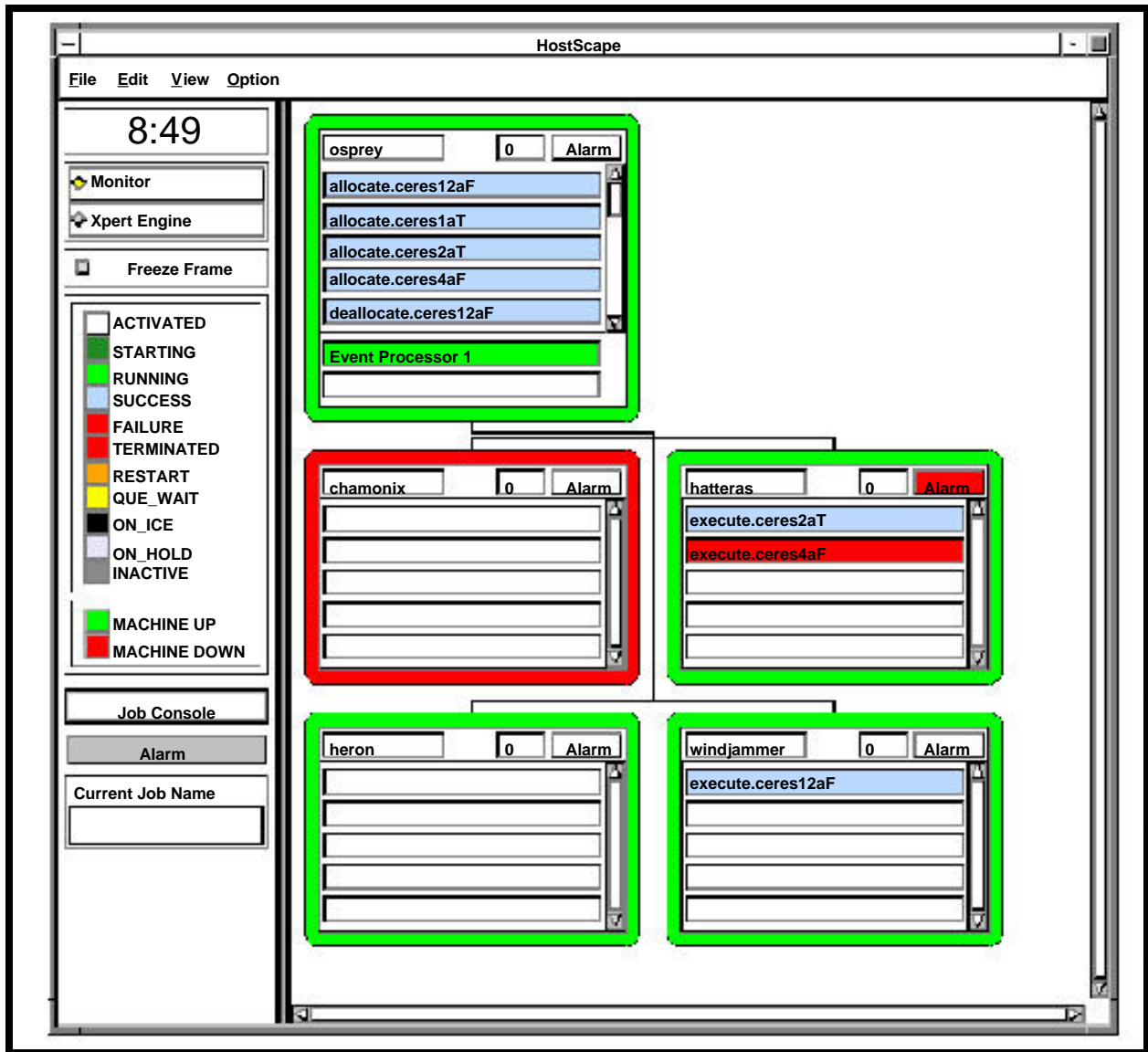
- 1 Access the command shell.
  - The command shell prompt is displayed.
- 2 Type **xhost +** then press the **Return/Enter** key on the keyboard.
- 3 Open another UNIX window.
- 4 Start the log-in to the appropriate server by typing either **telnet *servername*** (e.g., **sprn1sun**), **rlogin *servername***, or **rsh *servername*** in the second window then press the **Return/Enter** key.
  - If you use the **telnet** command, a **Login:** prompt appears; continue with Step 5.
  - If you use either the **rlogin** or **rsh** command, the system uses the User ID currently in use; go to Step 6.
- 5 If a **Login:** prompt appears, log in as yourself by typing your **UserID** then pressing the **Return/Enter** key.
- 6 At the **Password:** prompt type your **Password** then press the **Return/Enter** key.
- 7 Type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.
  - It is recommended that you use the terminal/workstation IP address instead of the machine-name for the ***clientname***.
- 8 Type **cd /*path*** then press **Return/Enter**.
  - Change directory to the directory (e.g., /home/kummerer/ssit/AutoSys) containing the AutoSys set-up file (i.e., Autosys\_Setup.com).

- 9 Type **source Autosys\_Setup.com** then press **Return/Enter**.
  - The **source** command sets the environment variables.
- 10 Type **autosys &** then press **Return/Enter** to launch AutoSys.
  - The **AutoSys GUI Control Panel** (Figure 14) is displayed.



*Figure 14. AutoSys GUI Control Panel*

- 11 Click on either the **HostScape**, **TimeScape**, or **JobScape** button.
  - The AutoXpert GUI corresponding to the selected button is displayed (Figures 15-17).
- 12 Select **Options** → **Edit Runtime Options** from the pull-down menu.
  - The **Runtime Options** dialog box is displayed.
- 13 If the refresh interval is to be modified, click on **Refresh Interval (Seconds)** and either type in a value between **1** and **99999** or click on the <| and >| keys as necessary to decrease or increase the current numerical value until the desired value is reached.
  - Default value is **30 seconds**.
  - The **Reloading Job Data** window reappears as often as specified in the **Refresh Interval (Seconds)** field.
- 14 If the ping interval is to be modified, click on **Ping Interval (Seconds)** and either type in a value between **1** and **99999** or click on the <| and >| keys as necessary to decrease or increase the current numerical value until the desired value is reached.
  - Default value is **300 seconds**.
  - If **99999** is entered, no **ping** commands are issued.



**Figure 15. AutoXpert HostScape GUI**



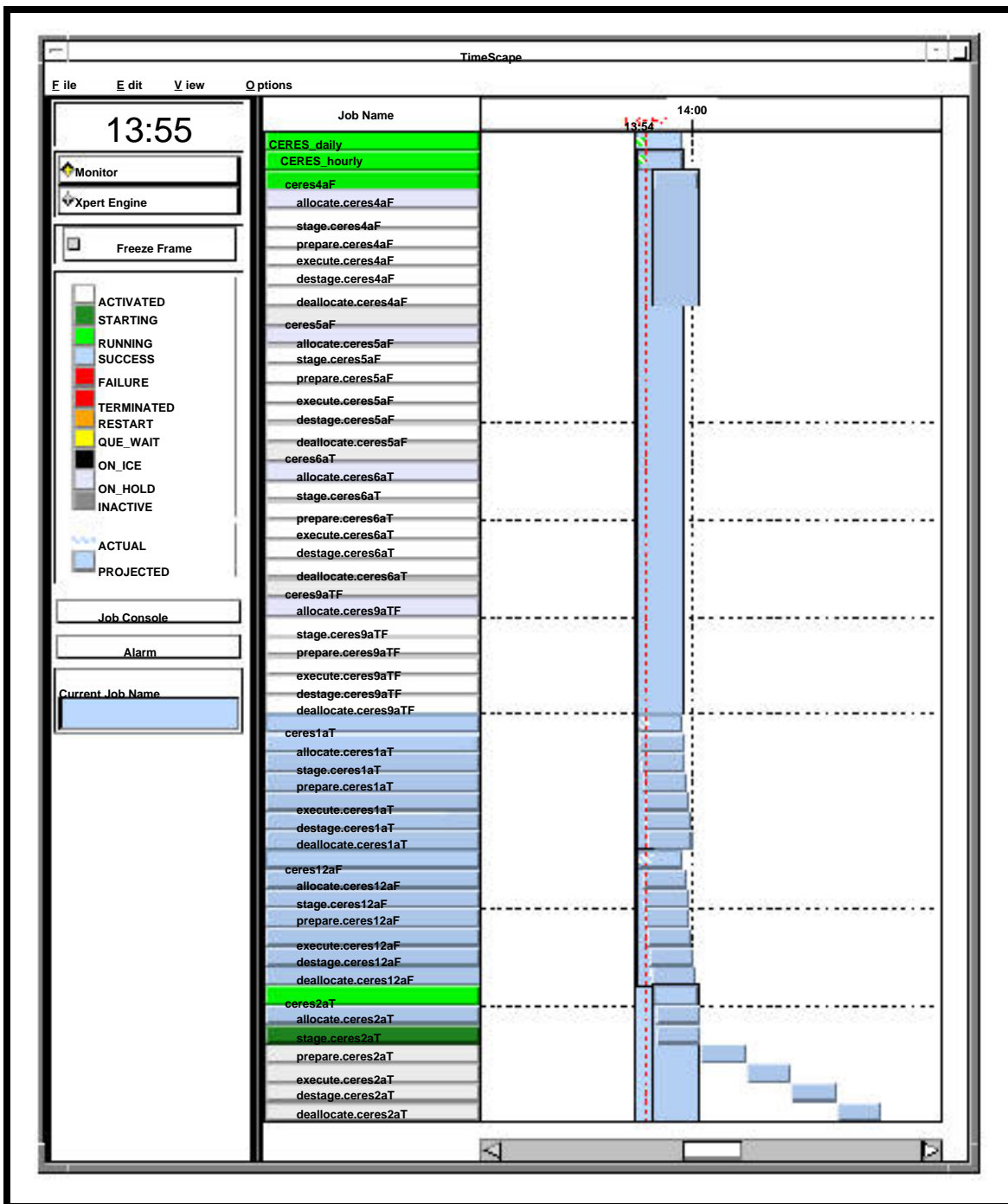


Figure 16. AutoXpert TimeScape GUI

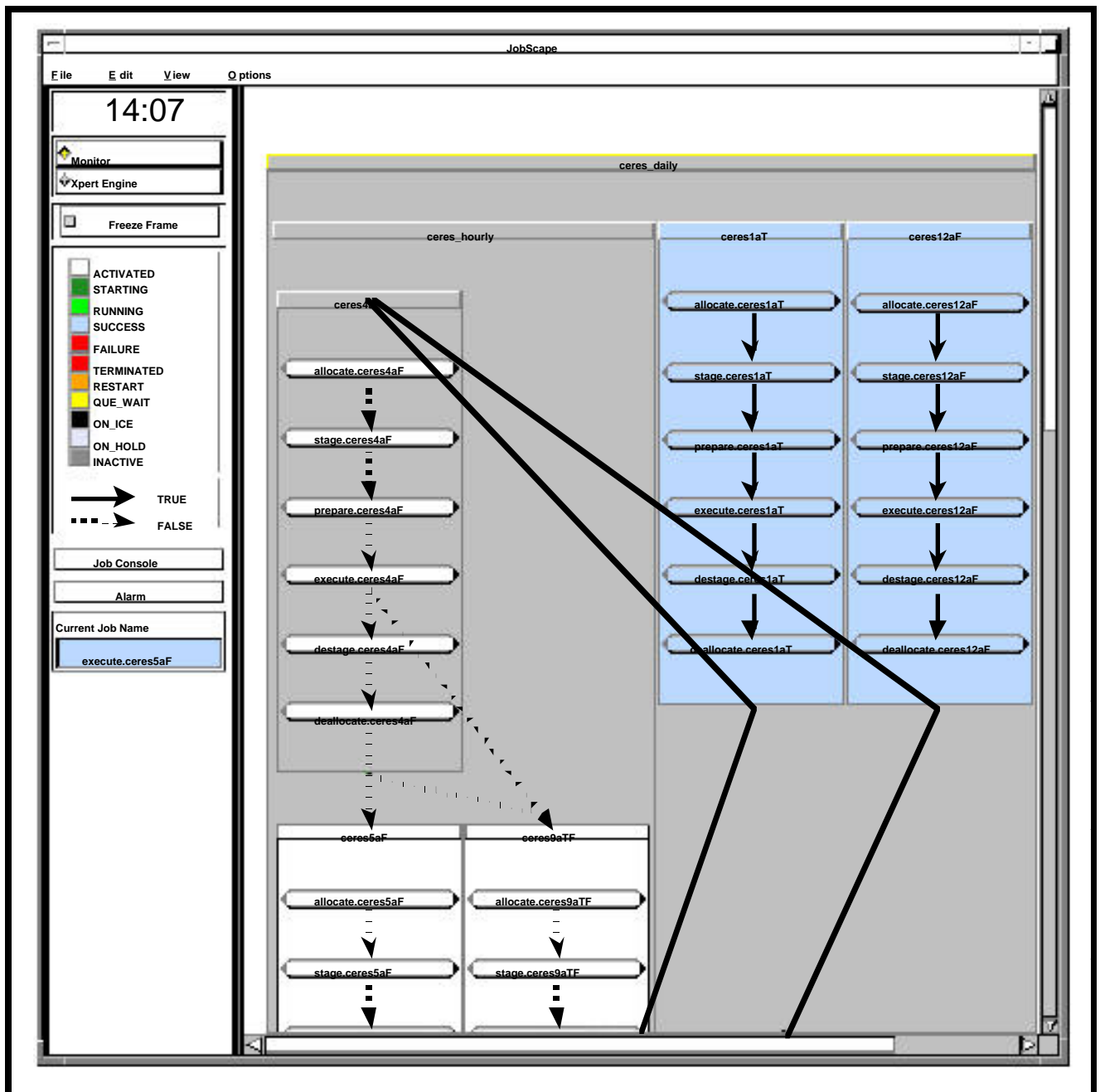


Figure 17. AutoXpert JobScape GUI

- 15 If the hang time is to be modified, click on **Hang Time (Minutes)** and either type in a value between **1** and **99999** or click the <| and |> keys as necessary to decrease or increase the current numerical value until the desired value is reached.
    - Default value is **1 minute**.
  - 16 If the number of inches/hour is to be modified, click on **Inches/Hr (inches)** and either type in a value or click the <| and |> keys as necessary to decrease or increase the current numerical value until the desired value is reached.
    - Default value is **2 inches/hr**.
  - 17 When all desired modifications have been entered, click on the **OK** button.
    - The runtime options are set.
    - The dialog box closes.
  - 18 If another of the AutoXpert GUIs needs to have its runtime options configured, repeat Steps 11 through 17 for the next GUI.
  - 19 Select **File** → **Exit** then click on the **OK** button to quit any of the AutoXpert GUIs (HostScape, JobScape or TimeScape).
    - The UNIX window is available for entering other commands.
  - 20 Click on the **Exit** button of the **AutoSys GUI Control Panel** to quit AutoSys.
- 

## Configuring Hardware Groups

This section explains how to configure AutoSys hardware groups. The purpose of configuring hardware groups is to make it easier to monitor the hardware associated with a particular function (e.g., testing, training, or a certain type of processing) rather than having to find those items in the default group, which is “All Machines.”

The Production Monitor may define a specific set of machines to be monitored as a group. The Production Monitor must know which machines are to be included in the group and should devise a useful name for the group.

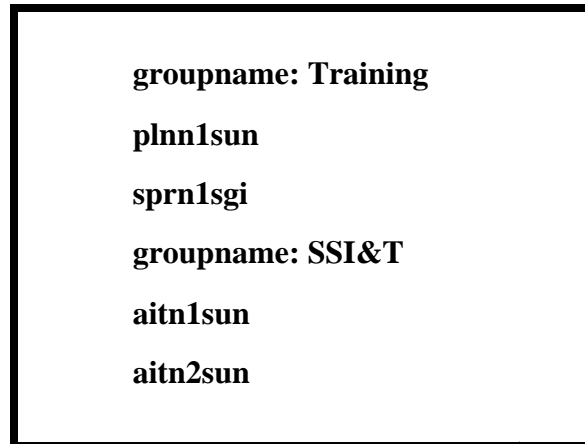
The Production Monitor must have access to UNIX commands in order to perform the procedure.

### Configuring Hardware Groups

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- 1 If necessary, log in to the planning server as described in Steps 1 through 7 of the procedure for **Configuring AutoSys Runtime Options**.
- 2 Type **cd /usr/ecs/Rel\_A/COTS/autotree2** then press the **Return/Enter** key on the keyboard.

- 3 Type **vi xpert.groups.XXX** (where **XXX** = the AUTOSERV instance) then press **Return/Enter**.
  - The configuration file is displayed by the vi text editor.
  - The AUTOSERV instance can be determined by typing **echo \$AUTOSERV** at the UNIX prompt.
- 4 Using vi editor commands create/modify hardware groups as necessary.
  - An example of a hardware group file is shown in Figure 18.



```
groupname: Training
plnn1sun
sprn1sgi
groupname: SSI&T
aitm1sun
aitm2sun
```

**Figure 18. AutoSys Hardware Group File**

- The first line of each machine group is in the format **groupname: *groupname***.
- The name of each machine to be included in the group is on a separate line.
- The following vi editor commands are useful:
  - **h** (move cursor left)
  - **j** (move cursor down)
  - **k** (move cursor up)
  - **l** (move cursor right)
  - **i** (insert text)
  - **x** (delete a character)
  - **u** (undo previous change)
  - **Esc** (switch to command mode)

- 5 Press the **Esc** key.
  - 6 Type **ZZ** then press **Return/Enter**.
    - New hardware groups are entered and saved in the file.
    - UNIX prompt is displayed.
  - 7 Launch **AutoSys** by typing **autos &** at the UNIX shell prompt.
  - 8 Click on the **HostScape** button.
    - The **HostScape** GUI (Figure 15) is displayed.
  - 9 Select **View** → **Select Machine Group** from the pull-down menu.
    - The **Machine Group Selection** dialog box is presented.
  - 10 Select (highlight) the machine group to be applied.
    - The **machine group** is highlighted.
  - 11 Click on the **OK** button.
    - The selected **machine group** is applied.
    - The **Machine Group Selection** dialog box closes.
-

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